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APOLLO MEASUREMENT REQUIREMENTS
VOLUME II. BOILERPLATE
MEASUREMENT LIST

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NAS9-150

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Approved by

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FOREWORD

The Apollo Measurement Requirements document is a compilation of all official measurement requirements for Apollo boilerplates, airframes, and test fixtures. This document comprises three volumes: Volume I, Master Measurement List; Volume II, Boilerplate Measurement List; and Volume III, Airframe and Test Fixture Measurement List.

Formal revisions will be made quarterly. Between formal revisions, pertinent information and changes will be published, as amendments, to ensure availability of current information. Measurement listings for boilerplates, airframes, and test fixtures that are not included will be published when they become available.

ABSTRACT

The official measurement requirements for Apollo boilerplates listed in Volume II are intended to provide control of measurement parameters resolved between contractors and subcontractors. These data will provide information and support for design requirements, system evaluation and integration, checkout and prelaunch testing, system operation and failure analysis, and flight operation and mission evaluation. All checkout and flight measurement requirements for boilerplates will appear in this document, except boilerplate 14, which will be included in Volume III.

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I. MEASUREMENT PROGRAM DESCRIPTION

MEASUREMENT CHANGE AND APPROVAL

After internal NAA change approval, the completed measurement lists, with changes to be negotiated, will be officially transmitted to MSC, ASP Systems Integration Office for evaluation prior to the next MSC-NAA monthly measurement meeting. The corrections will be incorporated into the measurement list after evaluation and NASA approval. Updated measurement lists will be resubmitted to MSC-ASP Office for final NASA approval.

The NAA System Integration Measurement Requirements Group will be the single-point contact for measurement coordination and will receive change requests, additions, or deletions for evaluation in conjunction with Equipment Integration and the responsible design groups. The NAA System Integration Measurement Requirements Group will be represented during major measurement requirements, implementation, or utilization meetings with the associate contractor, subcontractors, and NASA.

The project engineer for individual vehicles will approve all measurement requirements; measurement requirement changes will be negotiated with MSC-ASP Systems Integration for approval prior to incorporation in the official measurement lists.

BOILERPLATE MEASUREMENT LIST FORMAT AND NOMENCLATURE

Measurement Identification

The measurement identification block (Figure 1), which will be used on NAA prints and reference drawings, consists of seven characters (letters and numbers).

The first alpha character (module code) designates the measurement location by module.

- A Adapter
- B Booster
- C Command module
- L Launch escape tower
- S Service module

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MEAS ID	DESCRIPTION	MEASUREMENT			RANGE LOW HIGH UNIT	P R	RESPONSE RATE UNIT	LOCATION
		L	K	SC NO				
CA0001A	X AXIS SPACECRAFT ACCEL HIGH	A-16		-10	+20 G	P	0-30 CPS	XC78, YC0, ZC21
CA0002A	X AXIS SPACECRAFT ACCEL LOW	A-15		-2	+2 G	P	0-30 CPS	XC78, YC0, ZC21
CA0005A	Y AXIS SPACECRAFT ACCEL	A-13		-10	+10 G	P	0-20 CPS	XC78, YC0, ZC21

TELEMETRY
CHANNEL OR
RECORDED TRACK

MEASUREMENT
IDENTIFICATION
SUB CARRIER NUMBER
LINK
COMMUTATOR SEGMENT
RANGE
LOW HIGH UNIT

PRIORITY
RESPONSE UNIT
RATE UNIT

LOCATION

Figure 1-1. Measurement Parameters, Listed by System

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The second alpha character (functional system code) denotes the system within which the measurement originates.

A	Structures
C	Electrical
D	Launch escape
E	Earth landing
F	Environmental control
G	Guidance and navigation
H	Stabilization and control
J	Life systems
K	Flight technology
L	In-flight test
P	Propulsion
R	Reaction control
T	Communications and instrumentation

Numerical characters three through six are assigned sequentially or grouped for clarity within each system. The seventh character denotes measurement classification.

A	Acceleration	M	Mass
B	Phase	P	Pressure
C	Current	Q	Quantity
D	Vibration	R	Rate
E	Power	S	Strain
F	Frequency	T	Temperature
G	Force	V	Voltage
H	Position	W	Time
J	Biomedical	X	Discrete event
K	Radiation	Y	Acoustical
L	Velocity	Z	Ph-acidity

Measurement Description

The measurement description is a brief, definitive title given to each measurement. Standard abbreviations are used, where applicable, to keep the measurement description length within 32 characters including spaces.

Telemetry Channel or Recorder Track

1. Link (LK). LK designates the telemetry package or the r-f carrier as package A, package B, or package C.

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2. Subcarrier Number (SC No.). SC No. designates the telemetry channel in terms of Channels 1 through 18.
3. Commutator Segment (COM SEG). COM SEG designates the telemetry commutator segment assigned to the measurement for that vehicle.
4. Track (TK). TK designates the tape recorder track assigned to the measurement for that vehicle.

Data Range

The data range denotes the minimum and maximum values for a parameter in engineering units.

Priority

The priority column indicates the criticalness of the measurement.

1. P (primary) denotes the measurements that must be available at launch for mission success and/or to meet the flight objectives.
2. S (secondary) denotes the measurements that are highly desirable but will not abort or delay the mission.
3. M (multiple) designates a group of related measurements of which no more than a specified percentage may be inoperative.

Response Rate

The response rate denotes the rate and units required to provide satisfactory data resolution to time or wave form. Response for continuous data monitoring (telemetry or recorder) will be specified cycles per second (CPS) and sampled data monitoring (PCM or PACE) will be specified in samples per second (S/S).

Location

The location coordinate denotes the physical location within the space-craft where the measurement is taken. The location is given either in polar or linear coordinates and identified by type code.

P Polar
L Linear



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Accuracy

The accuracy will be an end-to-end accuracy specified in percent (not full scale).

APOLLO MEASUREMENT ABBREVIATIONS

ACCEL	Acceleration, accelerometer
ACT	Actuator
ADAPT	Adapter
AFRM	Airframe
AGC	Apollo guidance computer
AMP	Amplifier
ATT	Attitude
AX	Axis
BARO	Barometric
BATT	Battery
BMAG	Body-mounted attitude gyro
CCW	Counterclockwise
CDU	Coupling display unit
CHG	Change
CIR	Circle
CM	Command module
CMPTRSYN	Computer Syncronization
COMM	Commutator
COND	Condenser or conditioner
CW	Clockwise
DET	Detector
DIFF	Differential
DPTH	Depth
DR	Door
DRG	Drogue
DSIF	Deep Space Instrumentation Facility
EBW	Explosive bridge wire
ECA	Electronic control assembly
ECS	Environmental control system
ELS	Earth landing system
EMERG	Emergency
ENG	Engine
EPS	Electrical power system
ERR	Error
EXCIT	Excitation
F/C	Flow controller or fuel cell
FM	Frequency modulation
FWD	Forward

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G-N	Guidance and navigation
GYRO	Gyroscope
H	Helium
HF	High frequency
HS	Heat shield
HT	Heat
IGA	Inner gimbal angle
IMU	Inertial measurement unit
INDIC	Indicator
INJ	Injector
INT	Interior
INTMED	Intermediate
IN-PH	In-phase
IRIG	Inter-Range Instrumentation Group
ISOL	Isolation
JETT	Jettison
L. J. II	Little Joe II
LEM	Lunar excursion module
LES	Launch escape system
LOC	Location
MAN	Manual
MANIF	Manifold
MECH	Mechanical
MGA	Middle gimbal angle
MON	Monitor
MTR	Motor
N	Nitrogen
NAV	Navigation
NO	Number
O	Oxygen
OGA	Outer gimbal angle
OX	Oxidizer
PCM	Pulse code modulation
PHY	Physical
PIPA	Pulsed integrating pendulous accelerometer
POS	Position
PRESS	Pressure
PSA	Power and servo-assembly
PWR	Power
PYRO	Pyrotechnic
QAD	Quadrant
QUAN	Quantity
RCS	Reaction control system
RCVR	Receiver
REF	Reference

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REL	Release
RF	Radio frequency
RMS	Root mean square
RUPT	Rupture
SC	Spacecraft
SCS	Stabilization control system
SCT	Scan telescope
SENS	Sensor
SEP	Separation
SEQ	Sequence
SER-ENG	Service engine
SH, SHFT	Shaft
SHLD	Shield
SM	Service module
SMRD	Spin motor rotation detector
SQ	Square
SRV	Servo
STA	Station
SUP, SUPP	Supply
SURF	Surface
SW	Switch
SXT	Sextant
TEMP	Temperature
TK	Track
TLM	Telemetry
TV	Television
TWR	Tower
VHF/AM	Very high frequency
VIBRA, VIB	Vibration
VLV	Valve
WV	Wave
XCAPE	Escape
XDUCER	Transducer
XMTR	Transmitter

ENGINEERING UNITS ABBREVIATIONS

AMP	Ampères
CCM	Cubic centimeters
CM	Centimeters
CPS	Cycles per second
DEG	Degrees
DEG C	Degrees, Centigrade
DEG F	Degrees, Fahrenheit
DEG R	Degrees, Rankine
DEG/S	Degrees, per second

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DB	Decibels
E	Watts
FT/S	Feet per second
FT/S2	Feet per second squared
FT TON	Foot-ton
G	Gravitational unit
GAL	Gallons
GPM	Gallons per minute
GPS	Gallons per second
IN	Inches
IN/IN	Inch per inch
IN-LB	Inch-pounds
IN/S	Inches per second
KC	Kilocycles
KLB	Kilopounds
LB	Pounds
LB/FT2	Pounds per square foot
LB/HR	Pounds per hour
LB/S	Pounds per second
M	Meters
M AMP	Milliamperes
MC	Megacycles
ME	Milliwatts
MEE	Microwatts
MIN/IN, UIN/IN	Microinches per inch
MMA MP	Microamperes
MMS	Microseconds
MS	Milliseconds
MV	Millivolts
MV/M	Millivolts per meter
ND	Nondimensional
PH	Acidity (water)
PPS	Pulses per second
PSF	Pounds per square foot
PSI	Pounds per square inch
PSIA	Pounds per square inch absolute
PSID	Pounds per square inch differential
PSIG	Pounds per square inch gauge
PVAC	Peak volts alternating current
RPM	Revolutions per minute
R/S2	Radians per second squared
SFT2	Slug-feet squared
SLUG	Slugs
S/S	Samples per second
VAC	Volts alternating current
VDC	Volts direct current

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II. BOILERPLATE 6

MISSION

Early qualification of the launch escape system is the mission of boilerplate 6.

MEASUREMENT REQUIREMENTS

The following boilerplate 6 measurement list reflects the official measurement parameters, as of 5 March 1963, necessary to satisfy mission and system requirements.

R. B. Pearce
R. B. Pearce 695-500
Project Engineer
Boilerplate 6

Responsible Engineers:

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APOLLO BOILERPLATE MEASUREMENT LIST

BOILERPLATE 6 MARCH 13, 1963
PAGE NO. 1

SYSTEM STRUCTURES	MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE LOW HIGH UNIT	F RESPONSE RATE	R RATE	UNIT	LOCATION
C A0001 A X AXIS SPACECRAFT ACCEL	A-1C	HIGH	A-1C	-10 +20 G	F	0-30 CPS	XCT8, YCO, ZC21	
C A0032 A X AXIS SPACECRAFT ACCEL	A-15	LOW	A-15	-2 +2 G	P	0-30 CPS	XCT8, YCO, ZC21	
C A0055 A Y AXIS SPACECRAFT ACCEL	A-13		A-13	-10 +10 G	P	0-20 CPS	XCT8, YCO, ZC21	
C A0007 A Z AXIS SPACECRAFT ACCEL	A-14		A-14	-10 +10 G	P	0-20 CPS	XCT8, YCO, ZC21	
L A0011 A Y AXIS TOWER ACCEL	A-11		A-11	-10 +10 G	P	0-30 CPS	XL380, YLO, ZL6	
L A0012 A Z AXIS TOWER ACCEL	A-12		A-12	-10 +10 G	P	0-30 CPS	XL380, YL6, ZL0	
L A0013 D X AXIS TOWER VIBRATION UPPER	TRK 5		TRK 5	-50 +50 G	P	20-2500 CPS	XL120, YL25, ZL0	
L A0014 D Y AXIS TOWER VIBRATION UPPER	TRK 7		TRK 7	-50 +50 G	P	20-2500 CPS	XL120, YL25, ZL0	
L A0015 D Z AXIS TOWER VIBRATION UPPER	TRK 9		TRK 9	-50 +50 G	P	20-2500 CPS	XL120, YL25, ZL0	
L A0016 D X AXIS TOWER VIBRATION LOWER	TRK 1		TRK 1	-50 +50 G	P	20-2500 CPS	XL10, YL24, ZL26	
L A0017 D Y AXIS TOWER VIBRATION LOWER	TRK 11		TRK 11	-50 +50 G	P	20-2500 CPS	XL10, YL24, ZL26	
L A0018 D Z AXIS TOWER VIBRATION LOWER	TRK 13		TRK 13	-50 +50 G	H	20-2500 CPS	XL10, YL24, ZL26	
C AJ028 P CONICAL SURFACE PRESSURE 1	A-E - 7		A-E - 7	+15 +30 PSIA	H	10 S/S	XC30, 359 DEG	
C AJ029 P CONICAL SURFACE PRESSURE 2	A-E - 8		A-E - 8	+15 +30 PSIA	H	10 S/S	XC30, 21.5 DEG	
C AJ030 P CONICAL SURFACE PRESSURE 3	A-E - 9		A-E - 9	+15 +30 PSIA	H	10 S/S	XC30, 40.75 DEG	
C AJ031 P CONICAL SURFACE PRESSURE 4	A-E - 10		A-E - 10	+15 +30 PSIA	H	10 S/S	XC30, 84DEG	
C AJ032 P CONICAL SURFACE PRESSURE 5	A-E - 11		A-E - 11	+15 +30 PSIA	H	10 S/S	XC30, 179.5 DEG	

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APPOINTMENT MEASURE PLATE BODILY HARM LIST

SYSTEM STRUCTURES

BOILERPLATE 6

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PAGE NO. 2

MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL			DATA RANGE		P R RATE	RESPONSE UNIT	LOCATION
		L	SC	C0M K NO SEG	LOW	HIGH			
C A0C33 P CONICAL SURFACE PRESSURE 6		A-E	-12	+15	+30	PSIA	M	10	S/S XC30,203.75 CEE
C A0C34 P CONICAL SURFACE PRESSURE 7		A-E	-13	+15	+30	PSIA	P	10	S/S XC30,221.25 CEE
C A0C35 P CONICAL SURFACE PRESSURE 8		A-E	-14	+15	+30	PSIA	M	10	S/S XC30,246.5 DEG
C A0C36 P CONICAL SURFACE PRESSURE 9		A-E	-15	+15	+30	PSIA	P	10	S/S XC30,276CEE
C A0C37 P CONICAL SURFACE PRESSURE 10		A-E	-16	+15	+30	PSIA	M	10	S/S XC30,293.25 DEE
C A0C38 P CONICAL SURFACE PRESSURE 11		A-E	-17	+15	+30	PSIA	P	10	S/S XC30,318.75 CEE
C A0C39 P CONICAL SURFACE PRESSURE 12		A-E	-18	+15	+30	PSIA	P	10	S/S XC30,335.5 DEG
C A0C40 P CONICAL SURFACE PRESSURE 13		A-E	-19	+15	+30	PSIA	P	10	S/S XC100,357 CEE
C A0C41 P CONICAL SURFACE PRESSURE 14		A-E	-20	+15	+30	PSIA	P	10	S/S XC50.5,21.5 DEE
C A0C42 P CONICAL SURFACE PRESSURE 15		A-E	-21	+15	+30	PSIA	P	10	S/S XC71,41.916 CEE
C A0C43 P CONICAL SURFACE PRESSURE 16		A-E	-22	+15	+30	PSIA	P	10	S/S XC100,40.75 DEE
C A0C44 P CONICAL SURFACE PRESSURE 17		A-E	-23	+15	+30	PSIA	P	10	S/S XC100,221.25 CEE
C A0C45 P CONICAL SURFACE PRESSURE 18		A-E	-24	+15	+30	PSIA	P	10	S/S XC71,221.25 DEE
C A0C46 P CONICAL SURFACE PRESSURE 19		A-E	-25	+15	+30	PSIA	P	10	S/S XC100,318.75 CEE
C A0047 P CONICAL SURFACE PRESSURE 20		A-E	-26	+15	+30	PSIA	P	10	S/S XC71,318.75 CEE
C A0048 P CONICAL SURFACE PRESSURE 21		A-E	-27	+15	+30	PSIA	P	10	S/S XC50.5,335.5 CEE
C A0049 P CONICAL SURFACE PRESSURE 22		A-E	-28	+15	+30	PSIA	M	10	S/S XC50.5,359 DEG

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APOLLO BOILERPLATE MEASUREMENT LIST

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PAGE NO. 3

SYSTEM, STRUCTURES	MEAS. ID	MEASUREMENT DESCRIPTION	BOILERPLATE 6			F RESPONSE RATE	UNIT	LOCATION
			CHANNEL L SEC K NO SEC	DATA RANGE LOW HIGH	UNIT R			
C A0050 P CONICAL SURFACE PRESSURE 23	A-E -29	+15 +30 PSIA	P	10	S/S XC50.5,40.75 DEG			
C A0051 P CONICAL SURFACE PRESSURE 24	A-E -30	+15 +30 PSIA	P	10	S/S XC50.5,84.0 DEG			
C A0052 P CONICAL SURFACE PRESSURE 25	A-E -31	+15 +30 PSIA	P	10	S/S XC50.5,221.25 DEG			
C A0053 P CONICAL SURFACE PRESSURE 26	A-E -32	+15 +30 PSIA	P	10	S/S XC50.5,276 DEG			
C A0054 P CONICAL SURFACE PRESSURE 27	A-E -33	+15 +30 PSIA	P	10	S/S XC50.5,318.75 DEG			
C A0055 P CONICAL SURFACE PRESSURE 28	A-E -34	+15 +30 PSIA	P	10	S/S XC71,21.5 DEG			
C A0056 P CONICAL SURFACE PRESSURE 29	A-E -35	+15 +30 PSIA	P	10	S/S XC71,203.75 DEG			
C A0057 P CONICAL SURFACE PRESSURE 30	A-E -40	+15 +30 PSIA	P	10	S/S XC71,246.5 DEG			
C A0058 P CONICAL SURFACE PRESSURE 31	A-E -41	+15 +30 PSIA	P	10	S/S XC71,293.25 DEG			
C A0059 P CONICAL SURFACE PRESSURE 32	A-E -42	+15 +30 PSIA	P	10	S/S XC71,335.5 DEG			
C A0060 P CONICAL SURFACE PRESSURE 33	A-E -84	+15 +30 PSIA	P	10	S/S XC79,359 DEG			
C A0061 P CONICAL SURFACE PRESSURE 34	A-E -85	+15 +30 PSIA	P	10	S/S XC79,840EG			
C A0062 P CONICAL SURFACE PRESSURE 35	A-E -86	+15 +30 PSIA	P	10	S/S XC80.3,179.5 DEG			
C A0063 P CONICAL SURFACE PRESSURE 36	A-E -87	+15 +30 PSIA	P	10	S/S XC79,276DEG			
C A100 P BASE PRESSURE 1	A-E - 3	+8 +15 PSIA	M	10	S/S BOTM 50R,SCDEC			
C A101 P BASE PRESSURE 2	A-E - 4	+8 +15 PSIA	P	10	S/S BOTM 50R,0 DEG			
C A102 P BASE PRESSURE 3	A-E - 5	+8 +15 PSIA	M	10	S/S BOTM 50R,270DEG			

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APOLLO BOILERPLATE MEASUREMENT LIST

BOILERPLATE 6
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SYSTEM STRUCTURES	MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NG SEG	DATA RANGE LOW HIGH UNIT	P R RATE	RESPONSE UNIT	LOCATION
C AJ103 P BASE PRESSURE	-6	+8 +15 PSIA	P	10	S/S ACTM SOR, 1ECDG		
C AJ610 T CM INTERIOR TEMP	-76	+0 +150 DEG C	S	10	S/S CM INTERIOR		

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APOLLO BOILERPLATE MEASUREMENT LIST

SYSTEM ELECTRICAL	MEAS. ID	MEASUREMENT DESCRIPTION	BOILERPLATE 6			MARCH 13, 1962		
			CHANNEL L SC K NO	DATA RANGE LOW COM SEG	P HIGH UNIT	R RESPONSE RATE	UNIT LOCATION	
C C3001	V DC	VOLTAGE MAIN BUS A	A-E -51	+22	+32 VDC	F	10	S/S PWR CONTROL BOX
C C3002	V DC	VOLTAGE MAIN BUS B	A-E -64	+22	+32 VDC	P	10	S/S PWR CONTROL BOX
C C3003	V DC	VOLTAGE PYRC BUS A	A-E -52	+0	+32 VDC	F	10	S/S LES SEQUENCER
C C3004	V DC	VOLTAGE PYRG BUS B	A-E -53	+0	+32 VDC	P	10	S/S LES SEQUENCER
C C3005	C TOTAL	DC CURRENT	A-E -54	+0	+25 AMPS	P	10	S/S PWR CONTROL ECX

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APOLLO BOILERPLATE MEASUREMENT LIST

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEC	DATA RANGE		P RESPONSE RATE UNIT	LOCATION
			LOW	HIGH		
L C012 P	PITCH CONTROL MTR CHAMMER PRESS	A-E -43	+0	+2500	PSID	P 10 S/S XL345, YL0, ZL-13
L D013 P	ESCAPE MOTOR CHAMBER PRESSURE	A-E -38	+0	+2500	PSID	P 10 S/S XL29G, YL0, ZL0
L D016 V	ESCAPE MTR EBW A CHARGE	A-E -44	+0	+2500	VDC	P 10 S/S EBW MODULE
L D017 V	ESCAPE MTR EBW B CHARGE	A-E -45	+0	+2500	VDC	P 10 S/S EBW MODULE
L D018 V	TWR JETT MTR EBW A CHARGE	A-E -48	+0	+2500	VDC	P 10 S/S EBW MODULE
L D019 V	TWR JETT MTR EBW B CHARGE	A-E -49	+0	+2500	VDC	P 10 S/S EBW MODULE
C D021 X	ABORT INITIATE RELAY CLOSE A	A-E -55	STEP	P	10	S/S LES SEQUENCER
C D022 X	ABORT INITIATE RELAY CLOSE B	A-E -55	STEP	P	10	S/S LES SEQUENCER
C D027 X	ELS SEQ START RELAY CLOSE A	A-E -63	STEP	P	10	S/S LES SEQUENCER
C D038 X	ELS SEQ START RELAY CLOSE B	A-E -63	STEP	P	10	S/S LES SEQUENCER
L D049 V	PITCH CONTROL MTR EBW A CHG	A-E -46	+0	+2500	VDC	P 10 S/S EBW MODULE
L D050 V	PITCH CONTROL MTR EBW B CHG	A-E -47	+0	+2500	VDC	P 10 S/S EBW MODULE
L D051 T	TWR JETT MTR EBW MODULE TEMP	A-E -80	-50	+175	DEG C	P 10 S/S EBW MODULE
C D055 X	TWR SEP FIRE RELAY CLOSE A	A-E -62	STEP	P	10	S/S LES SEQUENCER
C D056 X	TWR SEP FIRE RELAY CLOSE B	A-E -62	STEP	P	10	S/S LES SEQUENCER
C D0107 X	TWR JETT MTR FIRE RLY CLOSE A	A-E -61	STEP	P	10	S/S LES SEQUENCER
C D0108 X	TWR JETT MTR FIRE RLY CLOSE B	A-E -61	STEP	P	10	S/S LES SEQUENCER

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A P O L L O B O I L E R P L A T E M E A S U R E M E N T L I S T
S Y S T E M E A R T H L A N D I N G
B O I L E R P L A T E 6

MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL			DATA RANGE	P	RESPONSE RATE	UNIT	LOCATION
		L	S C	C O M					
K	N O	S E G							
C E0001	X DRUGUE DEPLOY RELAY CLOSE A	A-E	-65		STEP	P	10	S/S	ELS SEQUENCER
C E0002	X DRUGUE DEPLOY RELAY CLOSE B	A-E	-65		STEP	F	10	S/S	ELS SEQUENCER
C E0003	X MN CHUTE DEPL-DRG REL RLY CL A	A-E	-66		STEP	P	10	S/S	ELS SEQUENCER
C E0004	X MN CHUTE DEPL-CRG REL RLY CL B	A-E	-66		STEP	F	10	S/S	ELS SEQUENCER
C E0005	X MN CHUTE RELEASE RELAY CLOSE A	A-E	-67		STEP	P	10	S/S	ELS SEQUENCER
C E0006	X MN CHUTE RELEASE RELAY CLOSE B	A-E	-67		STEP	F	10	S/S	ELS SEQUENCER
C E0007	X FWD HT SHLD RELEASE RLY CLOSE A	A-E	-60		STEP	P	10	S/S	ELS SEQUENCER
C E0008	X FWD HT SHLD RELEASE RLY CLOSE B	A-E	-60		STEP	F	10	S/S	ELS SEQUENCER

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APOLLO BOILERPLATE MEASUREMENT LIST

BOILERPLATE 6

MARCH 13, 1963
PAGE NO. 8

SYSTEM FLIGHT TECHNOLOGY	MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL			DATA RANGE LOW HIGH UNIT	P R R	RESPONSE RATE UNIT	LOCATION
			L SC K	S COM NO	S EG				
C K001 R PITCH RATE GYRO OUTPUT	A- 3	-100 +100 DEG/S	P	0-10 CPS	XC78, YCO, ZC21				
C K002 R YAW RATE GYRO OUTPUT	A- 4	-100 +100 DEG/S	F	0-10 CPS	XC78, YCO, ZC21				
C K003 R ROLL RATE GYRO OUTPUT	A- 2	-100 +100 DEG/S	P	0-10 CPS	XC78, YCO, ZC21				
C KJ016 H PITCH ATTITUDE GYRO OUTPUT	A-E -74	-175 +175 DEG	F	10	S/S XC78, YCO, ZC21				
C KJ017 H ROLL ATTITUDE GYRO OUTPUT	A-E -73	-175 +175 DEG	P	10	S/S XC78, YCO, ZC21				
C KJ018 H YAW ATTITUDE GYRO OUTPUT	A-E -75	-175 +175 DEG	F	10	S/S XC78, YCO, ZC21				
L K0023 H ANGLE OF ATTACK	A-E -35	-40 +40 DEG	P	10	S/S XL399, YCO, ZCO				
L K0024 H ANGLE OF SIDESLIP	A-E -36	-40 +40 DEG	F	10	S/S XL399, YCO, ZCC				
L K0025 P DYNAMIC PRESSURE	A-E -37	+0 +1250 PSF	P	10	S/S XL399, YCO, ZCO				

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APOLLO BOILERPLATE MEASUREMENT LIST

BOILERPLATE 6

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE		P RANGE	R RATE	UNIT	LOCATION
			LCH	HIGH				
C 10001 W	ON-BOARD TIMER	A-7			P	0-35	CPS	CM INTERIOR
C 10007 V	R AND Z CALIBRATION MONITOR	A-E -EE			STEP	P	10	S/S SIG COND E&X
C 10020 V	LINK A DIFF PDM (90X10 COMM)	TRK 3			P			POW TM COMM
C 10021 V	LINK A MIXER NO.2 OUTPUT	TRK 6			F			300-50KC TM MOD BUS
C 10025 V	0 VOLT REF (90X10 COMM) LINK A	A-E - 1	+0		VDC	P	10	S/S COMMUTATOR
C 10026 V	5 V REF (90X10 COMM) LINK A	A-E - 2	+5	VCC	P	10	S/S COMMUTATOR	
C 10027 V	SYNC (90X10 COMM) LINK A	A-E - 89	+5	VDC	P	10	S/S COMMUTATOR	
C 10028 V	SYNC (90X10 COMM) LINK A	A-E - 90	+5	VDC	P	10	S/S COMMUTATOR	
C 10201 T	TM RF XTR A TEMP	A-E - 78	+0	+150	DEG C	S	10	S/S TM RF XTR
C 10202 T	TM RF AMP A TEMP	A-E - 77	+0	+150	DEG C	S	10	S/S TM RF AMP

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III. BOILERPLATES 12 AND 23

MISSION

Early qualification of the launch escape system at maximum q is the mission of boilerplates 12 and 23.

MEASUREMENT REQUIREMENTS

The following measurement list for boilerplates 12 and 23 reflects the official measurement parameters, as of 5 March 1963, necessary to satisfy mission and system requirements.

R. B. Pearce
R. B. Pearce 695-500
Project Engineer
Boilerplate #12

Responsible Engineers:

C. Y. Tomita
C. Y. Tomita 695-312
Lead Engineer
Measurement Requirements Group

W. J. Barmore
W. J. Barmore 695-451
Engineer
Measurement Systems

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APOLLO BOILER PLATE MEASUREMENT LIST

SYSTEM
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BOILERPLATE 12, 23

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NG SEG	DATA RANGE		P RESPONSE RATE UNIT	R RATE UNIT	LOCATION
			LOW	HIGH			
C AJC01 A X AXIS SPACECRAFT ACCEL HIGH	A- 8	-10	+20 G	P 0-30 CPS XC78,YC1,ZC21			
C AJC02 A X AXIS SPACECRAFT ACCEL LOW	A-11	-2	+2 G	P 0-30 CPS XC78,YC1,ZC21			
C AJC05 A Y AXIS SPACECRAFT ACCEL	A- 5	-10	+10 G	P 0-20 CPS XC78,YC1,ZC21			
C AJC07 A Z AXIS SPACECRAFT ACCEL	A- 6	-10	+10 G	P 0-20 CPS XC78,YC0,ZC21			
L AJ011 A Y AXIS TOWER ACCEL	A- 9	-10	+10 G	P 0-30 CPS XL380,YLG,ZLG			
L AJ012 A Z AXIS TOWER ACCEL	A-10	-10	+10 G	P 0-30 CPS XL380,YL6,ZL6			
C AJC28 P CONICAL SURFACE PRESSURE 1	A-E - 7	+2	+22 PSIA	M 10 S/S XC30,359 DEG			
C AJ029 P CONICAL SURFACE PRESSURE 2	A-E - 8	+2	+22 PSIA	M 10 S/S XC30,21.5 CEG			
C AJ030 P CONICAL SURFACE PRESSURE 3	A-E - 9	+2	+22 PSIA	M 10 S/S XC30,40.75 DEG			
C AJ031 P CONICAL SURFACE PRESSURE 4	A-E -10	+2	+22 PSIA	M 10 S/S XC30,84 DEG			
C AJ032 P CONICAL SURFACE PRESSURE 5	A-E -11	+2	+22 PSIA	M 10 S/S XC30,179.5 DEG			
C AJ033 P CONICAL SURFACE PRESSURE 6	A-E -12	+2	+22 PSIA	M 10 S/S XC30,203.75 DEG			
C AJ034 P CONICAL SURFACE PRESSURE 7	A-E -13	+2	+22 PSIA	M 10 S/S XC30,221.25 DEG			
C AJ035 P CONICAL SURFACE PRESSURE 8	A-E -14	+2	+22 PSIA	M 10 S/S XC30,246.5 DEG			
C AJ036 P CONICAL SURFACE PRESSURE 9	A-E -15	+2	+22 PSIA	M 10 S/S XC30,276 DEG			
C AJ037 P CONICAL SURFACE PRESSURE 10	A-E -16	+2	+22 PSIA	M 10 S/S XC30,293.25 DEG			
C AJ038 P CONICAL SURFACE PRESSURE 11	A-E -17	+2	+22 PSIA	M 10 S/S XC30,318.75 DEG			

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APOLLO BCILER PLATE MEASUREMENT LIST

SYSTEM
STRUCTURES

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL			P	RESPONSE	LOCATION
		L	S	C			
C AJ039 P CONICAL SURFACE PRESSURE	12	A-E	-18	+2	+22	PSIA	M 10 S/S XC30,335.5 DEG
C AJ040 P CONICAL SURFACE PRESSURE	13	A-E	-19	+2	+22	PSIA	M 10 S/S XC100,357 DEG
C AJ041 P CONICAL SURFACE PRESSURE	14	A-E	-20	+2	+22	PSIA	M 10 S/S XC50.5,21.5 DEG
C AJ042 P CONICAL SURFACE PRESSURE	15	A-E	-21	+2	+22	PSIA	M 10 S/S XC71,41.916 DEG
C AJ043 P CONICAL SURFACE PRESSURE	16	A-E	-22	+2	+22	PSIA	M 10 S/S XC100,40.75 DEG
C AJ044 P CONICAL SURFACE PRESSURE	17	A-E	-23	+2	+22	PSIA	M 10 S/S XC100,221.25 DEG
C AJ045 P CONICAL SURFACE PRESSURE	18	A-E	-24	+2	+22	PSIA	M 10 S/S XC71,221.25 DEG
C AJ046 P CONICAL SURFACE PRESSURE	19	A-E	-25	+2	+22	PSIA	M 10 S/S XC100,318.75 DEG
C AJ047 P CONICAL SURFACE PRESSURE	20	A-E	-26	+2	+22	PSIA	M 10 S/S XC71,318.75 DEG
C AJ048 P CONICAL SURFACE PRESSURE	21	A-E	-27	+2	+22	PSIA	M 10 S/S XC50.5,335.5 DEG
C AJ049 P CONICAL SURFACE PRESSURE	22	A-E	-28	+2	+22	PSIA	M 10 S/S XC50.5,359 DEG
C AJ050 P CONICAL SURFACE PRESSURE	23	A-E	-29	+2	+22	PSIA	M 10 S/S XC50.5,40.75 DEG
C AJ051 P CONICAL SURFACE PRESSURE	24	A-E	-30	+2	+22	PSIA	M 10 S/S XC50.5,84 DEG
C AJ052 P CONICAL SURFACE PRESSURE	25	A-E	-31	+2	+22	PSIA	M 10 S/S XC50.5,221.25 DEG
C AJ053 P CONICAL SURFACE PRESSURE	26	A-E	-32	+2	+22	PSIA	M 10 S/S XC50.5,276 DEG
C AJ054 P CONICAL SURFACE PRESSURE	27	A-E	-33	+2	+22	PSIA	M 10 S/S XC50.5,318.75 DEG
C AJ055 P CONICAL SURFACE PRESSURE	28	A-E	-34	+2	+22	PSIA	M 10 S/S XC71,21.5 DEG

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A P O L L O B O I L E R P L A T E M E A S U R E M E N T L I S T
S Y S T E M
S T R U C T U R E S

MEAS. ID	MEASUREMENT DESCRIPTION	BOILERPLATE	12, 23	MARCH 13, 1963	
CHANNEL L SC COM K NO SEG	DATA RANGE LOW HIGH UNIT	P R RATE	R RATE	RESPONSE UNIT	LOCATION
C AJ056 P CONICAL SURFACE PRESSURE 29	A-E -39 +2 +22 PSIA	P	10	S/S XC71,202,75 DEG	
C AJ057 P CONICAL SURFACE PRESSURE 30	A-E -40 +2 +22 PSIA	P	10	S/S XC71,246,5 DEG	
C AJ058 P CONICAL SURFACE PRESSURE 31	A-E -41 +2 +22 PSIA	P	10	S/S XC71,293,25 DEG	
C AJ059 P CONICAL SURFACE PRESSURE 32	A-E -42 +2 +22 PSIA	P	10	S/S XC71,335,5 DEG	
C AJ060 P CONICAL SURFACE PRESSURE 33	A-E -84 +2 +22 PSIA	P	10	S/S XC79,259 DEG	
C AJ061 P CONICAL SURFACE PRESSURE 34	A-E -85 +2 +22 PSIA	P	10	S/S XC79,84DEG	
C AJ062 P CONICAL SURFACE PRESSURE 35	A-E -86 +2 +22 PSIA	P	10	S/S XC80,2,179.5 DEG	
C AJ063 P CONICAL SURFACE PRESSURE 36	A-E -87 +2 +22 PSIA	P	10	S/S XC79,276DEG	
C AJ100 P BASE PRESSURE 1	A-E - 3 +2 +15 PSIA	P	10	S/S BCTM SOR,90DEG	
C AJ101 P BASE PRESSURE 2	A-E - 4 +2 +15 PSIA	P	10	S/S BDTM SOR,0 DEG	
C AJ102 P BASE PRESSURE 3	A-E - 5 +2 +15 PSIA	P	10	S/S BCTM SOR,270DEG	
C AJ103 P BASE PRESSURE 4	A-E - 6 +2 +15 PSIA	P	10	S/S BDTM SOR,180DEG	
C AJ179 P FLUCTUATING PRESSURE 1	TRK 8 +0 +15 PSIA	P	0-300CPS	XC119,255 DEG	
C AJ180 P FLUCTUATING PRESSURE 2	TRK 9 +0 +15 PSIA	P	0-300CPS	XC70,0DEG	
C AJ181 P FLUCTUATING PRESSURE 3	TRK 10 +0 +15 PSIA	P	0-300CPS	XC40,0DEG	
S AJ182 P FLUCTUATING PRESSURE 4	TRK 12 +0 +15 PSIA	P	0-300CPS	XC12,0DEG	
S AJ183 P FLUCTUATING PRESSURE 5	A-14 +0 +15 PSIA	P	C-300CPS	XC12,180DEG	

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SID 62-1408-2

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APOLLO B C I L E R P L A T E M E A S U R E M E N T L I S T

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEC	DATA RANGE			P RESPONSE R RATE	UNIT R RATE UNIT	LOCATION
			LOW	HIGH	UNIT			
S A7184 P	FLUCTUATING PRESSURE 6	A-15	+0	+15	PSIA	N	0-300CPS	XA974,0DEG
S A7185 P	FLUCTUATING PRESSURE 7	A-16	+0	+15	PSIA	P	0-300CPS	XA974,90DEG
S A7186 P	FLUCTUATING PRESSURE 8	TRK 1	+0	+15	PSIA	M	C-300CPS	XA974,180DEG
S A7187 P	FLUCTUATING PRESSURE 9	TRK 5	+0	+15	PSIA	P	0-600CPS	XA974,270DEG
S A7188 P	FLUCTUATING PRESSURE 10	TRK 7	+0	+15	PSIA	P	0-600CPS	XA930,0DEG
S A7189 P	FLUCTUATING PRESSURE 11	TRK 11	+0	+15	PSIA	P	0-600CPS	XA991,0DEG
S A7190 P	FLUCTUATING PRESSURE 12	TRK 13	+0	+15	PSIA	M	C-600CPS	XA881,180DEG
C A7610 T	CM INTERIOR TEMP	A-E -76	+0	+150	DEG C	S	10	S/S CM INTERIOR
C A7611 P	CM INTERIOR PRESS	A-E -47	+0	+15	PSIA	S	10	S/S CM INTERIOR



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APOLLO BOILERPLATE MEASUREMENT LIST

SYSTEM ELECTRICAL	MEAS. ID	DESCRIPTION	BOILERPLATE			P	RESPONSE	RATE	UNIT	LOCATION
			CHANNEL L SC COM K NO SEG	DATA RANGE LOW HIGH	UNIT					
C C3001	V DC	VOLTAGE MAIN BUS A	A-E -51	+22	+32	VDC	P	10	S/S	PWR CONTROL BOX
C C3002	V DC	VOLTAGE MAIN BUS B	A-E -64	+22	+32	VDC	P	10	S/S	PWR CONTROL BOX
C C3003	V DC	VOLTAGE PYRO BUS A	A-E -52	+0	+32	VDC	P	10	S/S	LES SEQUENCER
C C3004	V CC	VOLTAGE PYRO BUS B	A-E -53	+0	+32	VDC	P	10	S/S	LES SEQUENCER
C C3005	C	TOTAL DC CURRENT	A-E -54	+0	+35	AMPS	P	10	S/S	PWR CONTROL BOX

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APOLLO BOILERPLATE MEASUREMENT LIST

SYSTEM
LAUNCH ESCAPE

BOILERPLATE 12, 23

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE		P RESPONSE R RATE	LOCATION
			LOW	HIGH		
L D0012 P	PITCH CONTROL MTR CHAMBER PRESS	A-E -45	+0	+2500 PSID	P 10	S/S XL345, YL0, ZL-13
L C0013 P	ESCAPE MOTOR CHAMBER PRESSURE	A-E -3E	+0	+2500 PSIC	P 10	S/S XL29C, YL0, ZLC
L D0016 V	ESCAPE MTR EBW A CHARGE	A-E -68	+0	+2500 VDC	P 10	S/S EBW MODULE
L C0017 V	ESCAPE MTR EPW P CHARGE	A-E -6S	+0	+2500 VDC	P 10	S/S EPW MODULE
L D0018 V	TWR JETT MTR EBW A CHARGE	A-E -49	+0	+2500 VDC	P 10	S/S EBW MODULE
L C0019 V	TWR JETT MTR EBW P CHARGE	A-E -50	+0	+2500 VDC	P 10	S/S EBW MODULE
C C0021 X	ABCRT INITIATE RELAY CLOSE A	A-E -55	STEP	P 10	S/S LES SEQUENCER	
C C0022 X	ABCRT INITIATE RELAY CLOSE R	A-E -55	STEP	P 10	S/S LES SEQUENCER	
C C0023 X	CM-SM SEP RELAY CLOSE A	A-E -56	STEP	P 10	S/S LES SEQUENCER	
C C0024 X	CM-SM SEP RELAY CLOSE P	A-E -56	STEP	P 10	S/S LES SEQUENCER	
C C0037 X	ELS SEQ START RELAY CLOSE A	A-E -63	STEP	P 10	S/S LES SEQUENCER	
C C0038 X	ELS SEC START RELAY CLOSE R	A-E -63	STEP	P 10	S/S LES SEQUENCER	
L D0049 V	PITCH CONTROL MTR EBW A CHG	A-E -46	+0	+2500 VDC	P 10	S/S EBW MODULE
L C0050 V	PITCH CONTROL MTR EBW R CHG	A-E -4E	+0	+2500 VDC	P 10	S/S EBW MODULE
L DJC51 T	TWR JETT MTR EPW MODULE TEMP	A-E -72	-50	+175 DEG C S	10	S/S EBW MODULE
C C0055 X	TWR SEP FIRE RELAY CLOSE A	A-E -62	STEP	P 10	S/S LES SEQUENCER	
C C0056 X	TWR SEP FIRE RELAY CLOSE R	A-E -62	STEP	P 10	S/S LES SEQUENCER	

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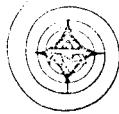
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APOLLO ROILER PLATE MEASUREMENT LIST

SYSTEM
LAUNCH ESCAPEBOILERPLATE 12, 23
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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE		P RESPONSE R RATE	UNIT	LOCATION
			LOW	HIGH			
D1057 F	PITCH CONTROL EBW MODULE TEMP	A-E -71	-50	+175	DEC C P	10	S/S EBW MODULE
C D107 X	TWR JETT MTR FIRE RLY CLOSE A	A-E -61			STEP P	10	S/S LES SEQUENCER
C D108 X	TWR JETT MTR FIRE RLY CLOSE B	A-E -61			STEP P	10	S/S LES SEQUENCER
H F150 V	LJ-11 LIFT-OFF SIGNAL A	A-E -57	+0	+28 VDC	F	10	S/S LJ-11 BOOSTER
B C151 V	LJ-11 LIFT-OFF SIGNAL B	A-E -58	+0	+28 VDC	P	10	S/S LJ-11 BOOSTER

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APOLLO BOILERPLATE MEASUREMENT LIST

SYSTEM^M
EARTH LANDING

BOILERPLATE 12, 23

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL			DATA RANGE	P	RESPONSE RATE	UNIT	LOCATION
		L SC COM	K NO SEG	LOW HIGH UNIT					
C E9001 X DRGUE DEPLOY RELAY CLOSE A	A-E -65	STEP	P	10	S/S	ELS	SEQUENCER		
C E9002 X DRGUE DEPLOY RELAY CLOSE B	A-E -65	STEP	P	10	S/S	ELS	SEQUENCER		
C E9003 X MN CHUTE DEPL-DRG, REL RLY CL A	A-E -66	STEP	P	10	S/S	ELS	SEQUENCER		
C E9004 X MN CHUTE DEPL-DRG REL RLY CL B	A-E -66	STEP	P	10	S/S	ELS	SEQUENCER		
C E9005 X MN CHUTE RELEASE RELAY CLOSE A	A-E -67	STEP	F	10	S/S	ELS	SEQUENCER		
C E9006 X MN CHUTE RELEASE RELAY CLOSE B	A-E -67	STEP	P	10	S/S	ELS	SEQUENCER		
C E9007 X FWC HT SHLD RELEASE RLY CLOSE A	A-E -60	STEP	P	10	S/S	ELS	SEQUENCER		
C E9008 X FWD HT SHLD RELEASE RLY CLOSE B	A-E -60	STEP	P	10	S/S	ELS	SEQUENCER		

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APOLLO BOILERPLATE MEASUREMENT LIST

BOILERPLATE 12, 23

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MEAS. ID	SYSTEM FLIGHT TECHNOLOGY	MEASUREMENT DESCRIPTION	CHANNEL		DATA RANGE		P RESPONSE RATE	UNIT	LOCATION
			L SC K NO	C OM SEG	LOW	HIGH			
C KJ001 R	PITCH RATE	GYRO OUTPUT	A-3		-60	+60	DEG/S	P	0-10 CPS XC78,YCO,ZC21
C KJ002 P	YAW RATE	GYRO OUTPUT	A-4		-60	+60	DEG/S	P	0-10 CPS XC78,YCO,ZC21
C KJ003 R	ROLL RATE	GYRO OUTPUT	A-2		-60	+60	DEG/S	P	0-10 CPS XC78,YCO,ZC21
C KJ016 P	PITCH ATTITUDE	GYRO OUTPUT	A-E -74		-175	+175	DEG	P	10 S/S XC78,YCO,ZC21
C KJ017 H	ROLL ATTITUDE	GYRO OUTPUT	A-E -73		-175	+175	DEG	P	10 S/S XC78,YCO,ZC21
C KJ018 H	YAW ATTITUDE	GYRO OUTPUT	A-E -75		-175	+175	DEG	P	10 S/S XC78,YCO,ZC21
L KJ023 H	ANGLE OF ATTACK		A-E -35		-40	+40	DEG	P	10 S/S XL399,YCO,ZCO
L KJ024 H	ANGLE OF SIDESLIP		A-E -36		-40	+40	DEG	P	10 S/S XL399,YCO,ZCC
L KJ025 P	DYNAMIC PRESSURE		A-E -37		+0	+1250	PSF	P	10 S/S XL399,YCO,ZCO

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APOLLO BOILERPLATE MEASUREMENT LIST

SYSTEM
COMMUNICATIONS AND INSTRUMENTATION

MEAS. ID	MEASUREMENT DESCRIPTION	BOILERPLATE 12, 23		F RESPONSE RATE UNIT	F RATE UNIT	LOCATION
		CHANNEL L SC COM K NO SEG	CATA RANGE LOW HIGH UNIT			
C T0001 W	ON-BOARD TIMER	A- 7	+0	P	0-35 CPS CM	INTERIOR
C T0002 V	TRANSPONDER A TRIGGER	A-E -43	+5 VDC	10	S/S TRANSPONDER A	
C T0003 V	TRANSPONDER B TRIGGER	A-E -44	+5 VDC	5	S/S TRANSPONDER B	
C T0007 V	R AND Z CALIBRATION MONITOR	A-E -88	STEP	P	10	S/S SIG COND BOX
C T0020 V	LINK A CIFF PCM (90X10 COMM)	TRK 3		F	PCM	
C T0021 V	LINK A MIXER NO. 2 OUTPUT	TRK 6		P	300-50KC	
C T0201 T	TR RF XMTR A TEMP	A-E -7E	+0	+150 DEG C S	10	S/S TM RF XMTR A
C T0202 T	TM RF AMP A TEMP	A-E -77	+0	+150 DEG C S	10	S/S TM RF AMP A

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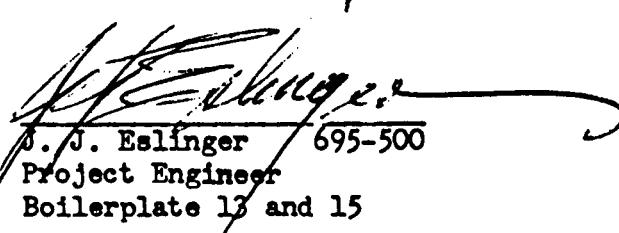
IV. BOILERPLATES 13 AND 15

MISSION

Launch injection of the nonrecoverable boilerplate spacecraft is the mission of boilerplates 13 and 15.

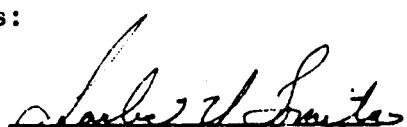
MEASUREMENT REQUIREMENTS

The following measurement list for boilerplates 13 and 15 reflects the official measurement parameters, as of 5 March 1963, necessary to satisfy mission and system requirements.



J. J. Eslinger 695-500
Project Engineer
Boilerplate 13 and 15

Responsible Engineers:



C. Y. Tomita 695-312
Lead Engineer
Measurement Requirements Group



W. J. Barmore 695-451
Engineer
Measurement Systems

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APOLLO C CILER PLATE MEASUREMENT LIST

BOILERPLATE 13, 15

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STRUCTURES

MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEC	DATA RANGE		P RESPONSE	LOCATION RATE UNIT
			LOW	HIGH		
C ACT01 L X AXIS SPACECRAFT ACCEL HIGH	C- 5	-2	+10	G	P	0-30 CPS XC78, YC0, ZC21
S ACT03 A Z AXIS SPACECRAFT ACCEL SM	A- 4	-2	+2	G	P	0-20 CPS XA866, YA0, ZA+73
S ACT04 E Y AXIS SPACECRAFT ACCEL SM	C- 4	-2	+2	G	P	0-20 CPS XA866, YA0, ZA+73
C ACT05 A Y AXIS SPACECRAFT ACCEL	A- 3	-2	+2	G	P	0-20 CPS XC78, YC0, ZC21
C ACT07 A Z AXIS SPACECRAFT ACCEL	B- 4	-2	+2	G	P	0-20 CPS XC78, YC0, ZC21
L ACT11 A Z AXIS TOWER ACCEL	A- 5	-2	+2	G	P	0-30 CPS XL380, YL0, ZL0
L ACT12 A Z AXIS TOWER ACCEL	A- 5	-2	+2	G	P	0-30 CPS XL380, YL6, ZL0
C ACT21 L CM RADIAL VIBRATION	A-16	-50	+50	G	P	20-1000C XC14, YC40.4, ZC37.3
A ACT22 L ADAPTER RADIAL VIBRATION	H-16	-50	+50	G	P	20-1000C XA722, YL55.5, ZA51.3
A ACT23 L ADAPTER LONG VIBRATION	B-17	-50	+50	G	P	20-1000C XA722, YL55.5, ZA51.3
S ACT24 C SM RADIAL VIBRATION	C-16	-50	+50	G	P	20-1000C XA1000, YA46.3, ZA42.7
S ACT25 C SM LONG VIBRATION	C-17	-50	+50	G	P	20-1000C XA1000, YA46.3, ZA42.7
S ACT26 C SM TRANSVERSE VIBRATION	C-18	-50	+50	G	P	20-1000C XA1000, YA46.3, ZA42.7
C ACT21 P CONICAL SURFACE PRESSURE 1	A-E -66	+0	+15	PSIA	P	10 S/S XC76, 357DEG
C ACT22 P CONICAL SURFACE PRESSURE 2	A-F -67	+0	+15	PSIA	M	10 S/S XC76, 87DEG
C ACT23 P CONICAL SURFACE PRESSURE 3	A-E -68	+0	+15	PSIA	P	10 S/S XC26, 357DEG
C ACT24 P CONICAL SURFACE PRESSURE 4	A-E -69	+0	+15	PSIA	M	10 S/S XC36, 93DEG

4-2

STD 62-1408-2

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A P O L L O R O T I L E R P L A T E M E A S U R E M E N T L I S T
S Y S T E M
S T R U C T U R E S

P O I L E R P L A T E 13, 15
M A R C H 13, 1963
P A G E N O . 2

MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE			P R E S P O N S E R R A T E	UNIT	LOCATION
			L O N G	H I G H	U N I T			
• C A 075 P C O N I C A L SURFACE PRESSURE 5	A-E -70	+0	+15	PSIA	R	10	S/S	XC29, 180DEG
• C A 076 P C O N I C A L SURFACE PRESSURE 6	A-E -71	+0	+15	PSIA	R	10	S/S	XC27, 357DEG
• C A 077 P C O N I C A L SURFACE PRESSURE 7	A-E -72	+0	+15	PSIA	R	10	S/S	XC27, 87DEG
C A 078 P C O N I C A L SURFACE PRESSURE 8	A-E -73	+0	+15	PSIA	R	10	S/S	XC20, 357DEG
C A 079 P C O N I C A L SURFACE PRESSURE 9	A-E -74	+0	+15	PSIA	R	10	S/S	XC20, 180DEG
C A 079 P FLUCTUATING PRESSURE 1	B-18	+0	+15	PSIA	R	1000	CPS	XC100, 357DEG
C A 080 P FLUCTUATING PRESSURE 2	C-15	+0	+15	PSIA	R	300	CPS	XC70, 357DEG
C A 081 P FLUCTUATING PRESSURE 3	B-15	+0	+15	PSIA	R	300	CPS	XC40, 357DEG
S A 082 P FLUCTUATING PRESSURE 4	A-15	+0	+15	PSIA	R	300	CPS	XC12, 357DEG
S A 083 P FLUCTUATING PRESSURE 5	C-14	+0	+15	PSIA	R	300	CPS	XC12, 177DEG
S A 084 P FLUCTUATING PRESSURE 6	B-14	+0	+15	PSIA	R	300	CPS	XA974, 357DEG
A-14	+0	+15	PSIA	R	300	CPS	XA974, 87DEG	
C-13	+0	+15	PSIA	R	300	CPS	XA974, 177DEG	
S A 086 P FLUCTUATING PRESSURE 8	B-13	+0	+15	PSIA	R	300	CPS	XA974, 267DEG
D A 087 P FLUCTUATING PRESSURE 9	A-12	+0	+15	PSIA	R	300	CPS	XA930, 357DEG
S A 088 P FLUCTUATING PRESSURE 10	C-12	+0	+15	PSIA	R	300	CPS	XA881, 357DEG
S A 089 P FLUCTUATING PRESSURE 11	B-12	+0	+15	PSIA	R	300	CPS	XA881, 177DEG



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A P O L L O B O I L E R P L A T E M E A S U R E M E N T L I S T
S Y S T E M
S T R U C T U R E S

B O I L E R P L A T E 1 3 , 1 5 M A R C H 1 3 , 1 9 6 3
P A G E N o . 3

M E A S . I D	M E A S U R E M E N T D E S C R I P T I O N	C H A N N E L L S C C O M K N O S E C	C A T A R A N G E		P R E S S U R E U N I T	R R A T E U N I T	L O C A T I O N
			L O W	H I G H			
S A 191 P	F L U C T U A T I N G P R E S S U R E 1 3	A - 1 1	+0	+15	P S I A	M	3 0 0
S A 192 . P	F L U C T U A T I N G P R E S S U R E 1 4	C - 1 1	+0	+15	P S I A	M	3 0 0
A A 193 P	F L U C T U A T I N G P R E S S U R E 1 5	B - 1 1	+0	+15	P S I A	M	3 0 0
A A 195 S	S T R A I N 1 A D A P T E R	A - 9	-1000	+1000	U I N / I	M	1 0 0
A A 196 S	S T R A I N 2 A D A P T E R	A - 1 0	-1000	+1000	U I N / I	M	1 0 0
A A 197 S	S T R A I N 3 A D A P T E R	B - 1 0	-1000	+1000	U I N / I	M	1 0 0
A A 198 S	S T R A I N 4 A D A P T E R	C - 1 0	-1000	+1000	U I N / I	M	1 0 0
• L A 199 S	S T R A I N 1 T O W E R D I A G O N A L	A - E - 8 4	-1000	+1000	U I N / I	M	3 5
L A 200 S	S T R A I N 1 T O W E R L E G	R - 7	-1000	+1000	U I N / I	M	3 5
L A 201 S	S T R A I N 2 T O W E R D I A G O N A L	A - E - 8 5	-1000	+1000	U I N / I	M	3 5
L A 202 S	S T R A I N 2 T O W E R L E G	C - 7	-1000	+1000	U I N / I	M	3 5
L A 203 S	S T R A I N 3 T O W E R D I A G O N A L	A - E - 8 6	-1000	+1000	U I N / I	M	3 5
L A 204 S	S T R A I N 3 T O W E R L E G	A - 7	-1000	+1000	U I N / I	M	3 5
L A 205 S	S T R A I N 4 T O W E R D I A G O N A L	A - E - 8 7	-1000	+1000	U I N / I	M	1 0
L A 206 S	S T R A I N 4 T O W E R L E G	A - 8	-1000	+1000	U I N / I	M	1 0
C A 580 P	H E A T F L U X (C A L O R I M E T E R) 1	A - 1 3 - 1 2	+0	+25	R / F / S	M	1 . 2 5
C A 581 R	H E A T F L U X (C A L O R I M E T E R) 2	A - 1 3 - 1 4	+0	+25	R / F / S	M	1 . 2 5

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APOLLO BOILERPLATE MEASUREMENT LIST

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SYSTEM STRUCTURES	MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE			P RESPONSE RATE	UNIT	LOCATION
				LOW	HIGH	UNIT			
C A-582 R HEAT FLUX (CALORIMETER)	3		A-13-16	+0	+25	B/F/S P	1.25	S/S	XC74,319DEG
C A-583 R HEAT FLUX (CALORIMETER)	4		A-13-18	+0	+25	B/F/S P	1.25	S/S	XC53,180CEG
C A-584 R HEAT FLUX (CALORIMETER)	5		A-13-20	+0	+25	B/F/S P	1.25	S/S	XC52,+3DEG
C A-585 R HEAT FLUX (CALORIMETER)	6		A-13-22	+0	+25	B/F/S P	1.25	S/S	XC52,80DEG
C A-586 R HEAT FLUX (CALORIMETER)	7		A-13-24	+0	+25	B/F/S P	1.25	S/S	XC52,+85DEG
C A-587 R HEAT FLUX (CALORIMETER)	8		A-13-26	+0	+25	B/F/S P	1.25	S/S	XC52,95DEG
C A-588 R HEAT FLUX (CALORIMETER)	9		A-13-28	+0	+25	B/F/S P	1.25	S/S	XC52,319DEG
* C A-589 R HEAT FLUX (CALORIMETER)	10		A-13-30	+0	+25	B/F/S P	1.25	S/S	XC27,3DEG
* C A-590 P HEAT FLUX (CALORIMETER)	11		A-13-32	+0	+25	B/F/S P	1.25	S/S	XC27,180CEG
* C A-591 R HEAT FLUX (CALORIMETER)	12		A-13-34	+0	+25	B/F/S M	1.25	S/S	XC27,319DEG
A A-592 P HEAT FLUX (CALORIMETER)	13		A-13-36	+0	+5	B/F/S P	1.25	S/S	XA933,3CEG
A A-593 R HEAT FLUX (CALORIMETER)	14		A-13-38	+0	+5	B/F/S P	1.25	S/S	XA933,93CEG
A A-594 P HEAT FLUX (CALORIMETER)	15		A-13-40	+0	+5	B/F/S P	1.25	S/S	XA933,183DEG
A A-595 R HEAT FLUX (CALORIMETER)	16		A-13-42	+0	+5	B/F/S P	1.25	S/S	XA933,273DEG
S A-596 R HEAT FLUX (CALORIMETER)	17		A-13-44	+0	+5	B/F/S P	1.25	S/S	XA770,3DEG
S A-597 R HEAT FLUX (CALORIMETER)	18		A-13-46	+0	+5	B/F/S P	1.25	S/S	XA770,93DEG
S A-598 R HEAT FLUX (CALORIMETER)	19		A-13-48	+0	+5	B/F/S P	1.25	S/S	XA770,183DEG

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APOLLO BOILERPLATE MEASUREMENT LIST

SYSTEM
STRUCTURES

BOILERPLATE 13, 15

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE LOW HIGH UNIT	P R RATE UNIT	RESPONSE UNIT	LOCATION
S A1599 R HEAT FLUX (CALORIMETER) 20		A-13-50	+0 +5	B/F/S M	1.25 S/S	XAT7C, 273DEG
L A1600 T TOWER TEMPERATURE 1		A-13-52	+0 +150	DEG C M	1.25 S/S	XL90, YL12, ZL0
L A1601 T TOWER TEMPERATURE 2		A-13-53	+0 +150	DEG C M	1.25 S/S	XL61, YL22, ZL0
L A1602 T TOWER TEMPERATURE 3		A-13-54	+0 +150	DEG C M	1.25 S/S	XL47, YL0, ZL23
L A1603 T TOWER TEMPERATURE 4		A-13-55	+0 +150	DEG C M	1.25 S/S	XL47, YL24, ZL23
L A1604 T TOWER TEMPERATURE 5		A-13-56	+0 +150	DEG C M	1.25 S/S	XL47, YL-24, ZL-23
L A1605 T TOWER TEMPERATURE 6		A-13-57	+0 +150	DEG C M	1.25 S/S	XL47, YL-24, ZL0
L A1606 T TOWER TEMPERATURE 7		A-13-58	+0 +150	DEG C M	1.25 S/S	XL47, YL-24, ZL23
L A1607 T TOWER TEMPERATURE 8		A-13-59	+0 +150	DEG C M	1.25 S/S	XL36, YL24, ZL0
C A1610 1 CM INTERIOR TEMP		A-13-4	+0 +150	DEG C S	1.25 S/S	CM INTERIOR
C A1611 P CM INTERIOR PRESS		A-E -88	+0 +15	PSIA S	10	S/S CM INTERIOR
S A1612 1 SM INTERIOR TEMP		A-13-5	+0 +150	DEG C S	1.25 S/S	SM INTERIOR
C A1651 T CALORIMETER RDY TEMP 1		A-13-13	+0 +300	DEG C S	1.25 S/S	XC74, 3CEG
C A1652 T CALORIMETER RDY TEMP 2		A-13-15	+0 +300	DEG C S	1.25 S/S	XC74, 180DEG
C A1653 T CALORIMETER RDY TEMP 3		A-13-17	+0 +300	DEG C S	1.25 S/S	XC74, 310DEG
C A1654 T CALORIMETER RDY TEMP 4		A-13-19	+0 +300	DEG C S	1.25 S/S	XC53, 180DEG
C A1655 T CALORIMETER RDY TEMP 5		A-13-21	+0 +300	DEG C S	1.25 S/S	XC52, 3DEG



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APOLLO B CILER PLATE MEASUREMENT LIST

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL			F	RESPONSE RATE	UNIT	LOCATION
		L SC	C OM	K NC				
		LOW	HIGH	UNIT	R			
C A2656 T CALORIMETER BODY TEMP 6	A-13-23	+0	+300	DEG C S	1.25	S/S	XCS2, 80DEG	
C A2657 T CALORIMETER BODY TEMP 7	A-13-25	+0	+300	DEG C S	1.25	S/S	XCS2, 85DEG	
C A2658 T CALORIMETER BODY TEMP 8	A-13-27	+0	+300	DEG C S	1.25	S/S	XCS2, 95DEG	
C A2659 T CALORIMETER BODY TEMP 9	A-13-29	+0	+300	DEG C S	1.25	S/S	XCS2, 3190EG	
* C A2660 T CALORIMETER BODY TEMP 10	A-13-31	+0	+300	DEG C S	1.25	S/S	XCS2, 30EG	
* C A2661 T CALORIMETER BODY TEMP 11	A-13-33	+0	+300	DEG C S	1.25	S/S	XCS2, 1800EG	
* C A2662 T CALORIMETER BODY TEMP 12	A-13-35	+0	+300	DEG C S	1.25	S/S	XCS2, 3190EG	
A A2663 T CALORIMETER BODY TEMP 13	A-13-37	+0	+300	DEG C S	1.25	S/S	XAS33, 30EG	
A A2664 T CALORIMETER BODY TEMP 14	A-13-39	+0	+300	DEG C S	1.25	S/S	XAS33, 93DEG	
A A2665 T CALORIMETER BODY TEMP 15	A-13-41	+0	+300	DEG C S	1.25	S/S	XAS33, 1830EG	
A A2666 T CALORIMETER BODY TEMP 16	A-13-43	+0	+300	DEG C S	1.25	S/S	XAS33, 2730EG	
S A1667 T CALORIMETER BODY TEMP 17	A-13-45	+0	+300	DEG C S	1.25	S/S	XAT70, 30EG	
S A2668 T CALORIMETER BODY TEMP 18	A-13-47	+0	+300	DEG C S	1.25	S/S	XAT70, 930EG	
S A2669 T CALORIMETER BODY TEMP 19	A-13-49	+0	+300	DEG C S	1.25	S/S	XAT70C, 1830EG	
S A2670 T CALORIMETER BODY TEMP 20	A-13-51	+0	+300	DEG C S	1.25	S/S	XAT70, 2730EG	

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APC L0 BOILERPLATE MEASUREMENT LIST

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ELECTRICAL

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NG SEG	DATA RANGE		P R RATE	RESPONSE UNIT	LOCATION
			LOW	HIGH			
C C001	V DC VOLTAGE MAIN BUS A	A-E -24	+22	+32	VDC	P	10 S/S PWR CONTROL BOX
C C002	V DC VOLTAGE MAIN BUS B	A-E -25	+22	+32	VDC	P	10 S/S PWR CONTROL BOX
C C003	V DC VOLTAGE LOGIC BUS A	A-E -22	+0	+32	VDC	P	10 S/S LES SEQUENCER
C C004	V DC VOLTAGE LOGIC BUS B	A-E -23	+0	+32	VDC	P	10 S/S LES SEQUENCER
C C005	V TOTAL DC CURRENT	A-E -26	+0	+50	AMPS	P	10 S/S PWR CONTROL BOX

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APOLLO BORER PLATE MEASUREMENT LIST

SYSTEM
LAUNCH ESCAPE

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MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL L SC COM K NO SEG	DATA RANGE		P RESPONSE R RATE	LOCATION
			LOW	HIGH		
C D033 X TWR JETT AND SEP RELAY CLOSE A	A-E -29	STEP	P	10	S/S LES SEQUENCER	
C D034 X TWR JETT AND SEP RELAY CLOSE A	A-E -29	STEP	P	10	S/S LES SEQUENCER	
C D039 V S-1 SEP SIGNAL A	A-E -37	+0	+32 VDC	P	10	S/S LES SEQUENCER
C D040 V S-1 SEP SIGNAL B	A-E -38	+0	+32 VDC	F	10	S/S LES SEQUENCER
C D041 X PYRO BUS ARM RLY CLOSE A	A-E -41	STEP	P	10	S/S LES SEQUENCER	
C D042 X PYRO BUS ARM RLY CLOSE B	A-E -41	STEP	P	10	S/S LES SEQUENCER	

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A P O L L O B O I L E R P L A T E M E A S U R E M E N T L I S T
SYSTEM COMMUNICATIONS AND INSTRUMENTATION
BOILERPLATE 13, 15

MEAS. ID	MEASUREMENT DESCRIPTION	CHANNEL		DATA RANGE		P R E S O N C E U N I T	L O W H I G H U N I T	R A T E	L O C A T I O N
		L S C O M K N O S E G	K N O S E G	L S C O M K N O S E G	K N O S E G				
C T0002	V TRANSPONDER A TRIGGER	A-E	-57	+0	+5 VDC	S	10	S/S	TRANSPONDER A
C T003	V TRANSPONDER B TRIGGER	A-E	-58	+0	+5 VDC	S	10	S/S	TRANSPONDER B
C T007	X R AND Z CALIBRATION MONITOR	A-E	-59		STEP	P	10	S/S	SIG CONC BOX
C T0201	T TM RF XMTR A TEMP	A-13-	6	+0	+150 DEG C	S	1.25	S/S	TM RF XMTR A
C T0202	T TM RF AMP A TEMP	A-13-	7	+0	+150 DEG C	S	1.25	S/S	TM RF AMP A
C T0203	T TM RF XMTR B TEMP	A-13-	8	+0	+150 DEG C	S	1.25	S/S	TM RF XMTR B
C T0204	T TM RF AMP B TEMP	A-13-	9	+0	+150 DEG C	S	1.25	S/S	TM RF AMP B
C T0205	T TM RF XMTR C TEMP	A-13-	10	+0	+150 DEG C	S	1.25	S/S	TM RF XMTR C
C T0207	T TM RF AMP C TEMP	A-13-	11	+0	+150 DEG C	S	1.25	S/S	TM RF AMP C

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V. BOILERPLATE 18

MISSION

The mission of boilerplate 18 is to qualify the C-1 launch vehicle and demonstrate separation of the spacecraft from the launch vehicle following S-IV stage burn-out.

MEASUREMENT REQUIREMENTS

The following boilerplate 18 measurement list reflects the proposed measurement parameters, as of 5 March 1963, necessary to satisfy mission and system requirements.

These measurements are being coordinated with NASA to further define the temperature measurements.

A. M. Krawicz 695-500
A. M. Krawicz
Project Engineer

Boilerplate 18

Responsible Engineers:

E. F. Kraly 695-312
E. F. Kraly
Engineer

Measurement Requirements Group

W. J. Barmore 695-451
W. J. Barmore
Engineer
Measurement Systems

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APOLLO VEHICLE LIST		BOILERPLATE 18			MARCH 5, 1962
MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE UNIT	
CA0001A	X AXIS SPACECRAFT ACCEL HIGH	-2	+10 G	0-30	CPS
CA0003A	Y AXIS SPACECRAFT ACCEL	-2	+2 G	0-30	CPS
CA0007A	Z AXIS SPACECRAFT ACCEL	-2	+2 G	0-30	CPS
LA0011A	Y AXIS TOWER ACCEL	-2	+2 G	0-30	CPS
LA0012A	Z AXIS TOWER ACCEL	-2	+2 G	0-30	CPS
SA0301X	SM PROP ENGINE BREAKWIRE A	STEP	10	S/S	
SA0301X	SM PROP ENGINE BREAKWIRE B	STEP	10	S/S	
CA0611CT	CM INTERIOR TEMP	+0	+15 C DEG C	1.25	S/S
CA0611P	CM INTERIOR PRESS	+0	+15 PSIA	10	S/S
SA0612T	SM INTERIOR TEMP	+0	+150 DEG C	1.25	S/S
SA0613P	SM INTERIOR PRESS	+0	+15 PSIA	10	S/S
AA0614P	ADAPT INTERIOR PRESS	+0	+15 PSIA	10	S/S
AA0615T	ADAPT INTERIOR TEMP	+0	+150 DEG C	1.25	S/S
SA2001S	CMP PAD BEAM AXIAL STRAIN 1	-7000	+7000 UIN/IN	0-35	CPS
SA2002S	CMP PAD BEAM AXIAL STRAIN 2	-7000	+7000 UIN/IN	0-35	CPS
SA2003S	CMP PAD BEAM AXIAL STRAIN 3	-7000	+7000 UIN/IN	10	S/S
SA2004S	CMP PAD BEAM AXIAL STRAIN 4	-7000	+7000 UIN/IN	10	S/S
SA2005S	CMP PAD BEAM AXIAL STRAIN 5	-7000	+7000 UIN/IN	10	S/S
SA2006S	CMP PAD BEAM AXIAL STRAIN 6	-7000	+7000 UIN/IN	10	S/S

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APOLLO VEHICLE LIST

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	BOILERPLATE 18		RESPONSE RATE	UNIT
			DATA LOW	RANGE HIGH		
SA2007S	CMP PAD BEAM AXIAL STRAIN 7	-7000	+7000	UIN/IN	10	S/S
SA2008S	CMP PAD BEAM AXIAL STRAIN 8	-7000	+7000	UIN/IN	10	S/S
SA2009S	CMP PAD BEAM AXIAL STRAIN 9	-7000	+7000	UIN/IN	10	S/S
SA2010S	CMP PAD BEAM AXIAL STRAIN 10	-7000	+7000	UIN/IN	10	S/S
SA2011S	CMP PAD BEAM AXIAL STRAIN 11	-7000	+7000	UIN/IN	10	S/S
SA2012S	CMP PAD BEAM AXIAL STRAIN 12	-7000	+7000	UIN/IN	10	S/S
AA2050S	ADAPT AXIAL STRAIN 1 (STA 160)	-7000	+7000	UIN/IN	10	S/S
AA2051S	ADAPT AXIAL STRAIN 2 (STA 160)	-7000	+7000	UIN/IN	10	S/S
AA2052S	ADAPT AXIAL STRAIN 3 (STA 160)	-7000	+7000	UIN/IN	10	S/S
AA2053S	ADAPT AXIAL STRAIN 4 (STA 160)	-7000	+7000	UIN/IN	10	S/S
AA2054S	ADAPT AXIAL STRAIN 5 (STA 160)	-7000	+7000	UIN/IN	10	S/S
AA2060S	ADAPT AXIAL STRAIN 1 (STA 195)	-7000	+7000	UIN/IN	10	S/S
AA2061S	ADAPT AXIAL STRAIN 2 (STA 195)	-7000	+7000	UIN/IN	10	S/S
AA2062S	ADAPT AXIAL STRAIN 3 (STA 195)	-7000	+7000	UIN/IN	10	S/S
AA2063S	ADAPT AXIAL STRAIN 4 (STA 195)	-7000	+7000	UIN/IN	10	S/S
AA2064S	ADAPT AXIAL STRAIN 5 (STA 195)	-7000	+7000	UIN/IN	10	S/S
AA2070S	ADAPT AXIAL STRAIN 1 (STA 95)	-7000	+7000	UIN/IN	0-25	CPS
AA2071S	ADAPT AXIAL STRAIN 2 (STA 95)	-7000	+7000	UIN/IN	0-25	CPS
AA2072S	ADAPT AXIAL STRAIN 3 (STA 95)	-7000	+7000	UIN/IN	0-25	CPS

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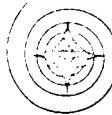
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APOLLO VEHICLE LIST

MARCH 5, 1962

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE UNIT
AA2073S	ADAPT AXIAL STRAIN 4 (STA 95)	-7000 +7000	UN/IN	0-25 CPS
SA2102S	SM SHELL CIR STRAIN 1 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2101S	SM SHELL CIR STRAIN 2 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2102S	SM SHELL CIR STRAIN 3 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2103S	SM SHELL CIR STRAIN 4 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2104S	SM SHELL CIR STRAIN 5 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2105S	SM SHELL CIR STRAIN 6 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2106S	SM SHELL CIR STRAIN 7 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2107S	SM SHELL CIR STRAIN 8 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2108S	SM SHELL CIR STRAIN 9 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2109S	SM SHELL CIR STRAIN 10 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2110S	SM SHELL CIR STRAIN 11 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2111S	SM SHELL CIR STRAIN 12 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2132S	SM SHELL AXIAL STRAIN 1 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2133S	SM SHELL AXIAL STRAIN 2 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2134S	SM SHELL AXIAL STRAIN 3 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2135S	SM SHELL AXIAL STRAIN 4 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2136S	SM SHELL AXIAL STRAIN 5 (STA277)	-7000 +7000	UN/IN	0-500 CPS
SA2137S	SM SHELL AXIAL STRAIN 6 (STA277)	-7000 +7000	UN/IN	0-500 CPS



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APOLLO VEHICLE LIST

MARCH 5, 1963

MEAS NC	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE		RESPONSE RATE	UNIT
			LOW	HIGH		
SA2150S	SM RCS SUPPORT MEMBER STRAIN 1		-7000	+7000	UIN/IN	0-35 CPS
SA2151S	SM RCS SUPPORT MEMBER STRAIN 2		-7000	+7000	UIN/IN	0-35 CPS
SA2152S	SM RCS SUPPORT MEMBER STRAIN 3		-7000	+7000	UIN/IN	0-250 CPS
SA2153S	SM RCS SUPPORT MEMBER STRAIN 4		-7000	+7000	UIN/IN	0-250 CPS
SA2160S	SM BEAM INNER CAP AX STRAIN 1		-7000	+7000	UIN/IN	10 S/S
SA2161S	SM REAR INNER CAP AX STRAIN 2		-7000	+7000	UIN/IN	10 S/S
SA2162S	SM REAR INNER CAP AX STRAIN 3		-7000	+7000	UIN/IN	10 S/S
SA2163S	SM REAR INNER CAP AX STRAIN 4		-7000	+7000	UIN/IN	10 S/S
SA2164S	SM BEAM INNER CAP AX STRAIN 5		-7000	+7000	UIN/IN	10 S/S
SA219CS	SM FLUCTUATING PRESS 1		+0	+15 PSIA	0-330 CPS	
SA2191S	SM FLUCTUATING PRESS 2		+0	+15 PSIA	0-330 CPS	
SA2201S	SM PANEL VIBRATION 1		-50	+50 G	20-1K CPS	
SA2201S	SM PANEL VIBRATION 2		-50	+50 G	20-1K CPS	
SA2202S	SM PANEL VIBRATION 3		-50	+50 G	20-1K CPS	
SA2203S	SM PANEL VIBRATION 4		-50	+50 G	20-1K CPS	
SA2204S	SM PANEL VIBRATION 5		-50	+50 G	20-1K CPS	
AA2220Q	ADAPT SKIN VIBRATION 1		-50	+50 G	20-1K CPS	
AA2221Q	ADAPT SKIN VIBRATION 2		-50	+50 G	20-1K CPS	
AA2222Q	ADAPT SKIN VIBRATION 3		-50	+50 G	20-1K CPS	

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APOLLO VEHICLE LIST

MARCH 5, 1963

BOILERPLATE 18

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
SA2370T	HEAT FLUX (CALORIMETER) 1	+0	+10 B/F/S	1.25	S/S
SA2371T	HEAT FLUX (CALORIMETER) 2	+0	+10 B/F/S	1.25	S/S
SA2372T	HEAT FLUX (CALORIMETER) 3	+0	+10 B/F/S	1.25	S/S
SA2373T	HEAT FLUX (CALORIMETER) 4	+0	+10 B/F/S	1.25	S/S
SA2374T	HEAT FLUX (CALORIMETER) 5	+0	+10 B/F/S	1.25	S/S
SA2375T	HEAT FLUX (CALORIMETER) 6	+0	+10 B/F/S	1.25	S/S
SA2376T	HEAT FLUX (CALORIMETER) 7	+0	+10 B/F/S	1.25	S/S
SA2377T	HEAT FLUX (CALORIMETER) 8	+0	+10 B/F/S	1.25	S/S
SA2378T	HEAT FLUX (CALORIMETER) 9	+0	+10 B/F/S	1.25	S/S
SA2379T	HEAT FLUX (CALORIMETER) 10	+0	+1G B/F/S	1.25	S/S
SA2380T	HEAT FLUX (CALORIMETER) 11	+0	+10 B/F/S	1.25	S/S
SA2400T	CALORIMETER BODY TEMP 1	+0	+250 DEG C	1.25	S/S
SA2401T	CALORIMETER BODY TEMP 2	+0	+250 DEG C	1.25	S/S
SA2402T	CALORIMETER BODY TEMP 3	+0	+250 DEG C	1.25	S/S
SA2403T	CALORIMETER BODY TEMP 4	+0	+250 DEG C	1.25	S/S
SA2404T	CALORIMETER BODY TEMP 5	+0	+250 DEG C	1.25	S/S
SA2405T	CALORIMETER BODY TEMP 6	+0	+250 DEG C	1.25	S/S
SA2406T	CALORIMETER BODY TEMP 7	+0	+250 DEG C	1.25	S/S
SA2407T	CALORIMETER BODY TEMP 8	+0	+250 DEG C	1.25	S/S

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MARCH 5, 1963

BOILERPLATE 18

APOLLO VEHICLE LIST

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE			RESPONSE RATE	UNIT
			LOW	HIGH			
SA24C8T	CALORIMETER BODY TEMP 9	+0	+250	DEG C	1.25	S/S	
SA2409T	CALORIMETER BODY TEMP 10	+0	+250	DEG C	1.25	S/S	
SA24010	CALORIMETER BODY TEMP 11	+0	+250	DEG C	1.25	S/S	
CC0001V	DC VOLTAGE MAIN BUS A	+22	+32	VDC	10	S/S	
CC0002V	DC VOLTAGE MAIN BUS B	+22	+32	VDC	10	S/S	
CC0003V	DC VOLTAGE PYRO BUS A	+0	+32	VDC	10	S/S	
CC0004V	DC VOLTAGE PYRO BUS B	+0	+32	VDC	10	S/S	
CC0005V	TOTAL CC CURRENT	+0	+50	AMPS	10	S/S	
AC0010V	DC VOLTAGE PYRO BUS C (ADAPTER)	+0	+32	VDC	10	S/S	
AC0011V	DC VOLTAGE PYRO BUS D (ADAPTER)	+0	+32	VDC	10	S/S	
CD0039X	S-1 SEP SIGNAL A	+0	+32	VDC	10	S/S	
CD0040X	S-1 SEP SIGNAL B	+0	+32	VDC	10	S/S	
CD0107X	TWR JETT MTR FIRE RLY CLOSE A	STEP	10	S/S			
CD0108X	TWR JETT MTR FIRE RLY CLOSE B	STEP	10	S/S			
SC0120X	ADAPT/SM SEP PHYSICAL MN A	STEP	10	S/S			
SC0121X	ADAPT/SM SEP PHYSICAL MN B	STEP	10	S/S			
SD0122X	ADAPT/SM SEP PHYSICAL MN C	STEP	10	S/S			
SD0123X	ADAPT/SM SEP PHYSICAL MN D	STEP	10	S/S			

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APOLLO VEHICLE LIST

BOILERPLATE 18

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CDO126X	ADAPT/SM SEP RELAY CLOSE B	STEP	10	S/S	
ADC130X	S-IV/ACAPT SEP PHY MON A	STEP	10	S/S	
ADD131X	S-IV/ADAPT SEP PHY MON B	STEP	10	S/S	
ADC132X	S-IV/ADAPT SEP PHY MON C	STEP	10	S/S	
CDO140X	S-IV/ACAPT SEP RELAY CLOSE A	STEP	10	S/S	
CDO141X	S-IV/ADAPT SEP RELAY CLOSE B	STEP	10	S/S	
CCO160X	S-IV CUTOFF SIGNAL A	+0	+32 VDC	10	S/S
CCD161X	S-IV CUTOFF SIGNAL B	+0	+32 VDC	10	S/S
CHO350X	SM RCS ACTIVATE RELAY CLOSE A	STEP	10	S/S	
CHO351X	SM RCS ACTIVATE RELAY CLOSE B	STEP	10	S/S	
CK0001R	PITCH RATE GYRO OUTPUT	-20	+20 DEG/S	0-20	CPS
CK0002R	YAW RATE GYRO OUTPUT	-20	+20 DEG/S	0-20	CPS
CK0003R	ROLL RATE GYRO OUTPUT	-20	+20 DEG/S	0-20	CPS
CK0016H	PITCH ATTITUDE GYRO OUTPUT	-60	+120 DEG	10	S/S
CK0017H	ROLL ATTITUDE GYRO OUTPUT	-20	+20 DEG	10	S/S
CK0018H	YAW ATTITUDE GYRO OUTPUT	-45	+45 DEG	10	S/S
AK0100H	S-IV/SC SEPARATION BOBBIN D	+0	+100 IN	10	S/S
AK0101H	S-IV/SC SEPARATION BOBBIN E	+0	+100 IN	10	S/S
AK0102H	S-IV/SC SEPARATION BOBBIN F	+0	+100 IN	10	S/S

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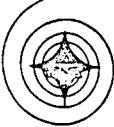
APOLLO VEHICLE LIST

MARCH 5, 1962

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	BOILERPLATE 18		RESPONSE RATE UNIT	
			DATA LOW	DATA HIGH	RATE	UNIT
SK0103H	SM/ADAPT PANEL 1 BOBBIN A	-10	+400	IN	0-35	CPS
SK0104H	SM/ADAPT PANEL 1 BOBBIN B	-10	+350	IN	0-35	CPS
SK0105H	SM/ADAPT PANEL 1 BOBBIN C	-10	+200	IN	0-35	CPS
SK0106H	SM/ADAPT PANEL 2 BOBBIN A	-10	+400	IN	0-35	CPS
SK0107H	SM/ADAPT PANEL 2 BOBBIN B	-10	+350	IN	0-35	CPS
SK0108H	SM/ADAPT PANEL 2 BOBBIN C	-10	+200	IN	0-35	CPS
SK0109H	SM/ADAPT PANEL 3 BOBBIN A	-10	+400	IN	0-35	CPS
SK0110H	SM/ADAPT PANEL 3 BOBBIN B	-10	+350	IN	0-35	CPS
SK0111H	SM/ADAPT PANEL 3 BOBBIN C	-10	+200	IN	0-35	CPS
SK0112H	SM/ADAPT PANEL 4 BOBBIN A	-10	+400	IN	0-35	CPS
SK0113H	SM/ADAPT PANEL 4 BOBBIN B	-10	+350	IN	0-35	CPS
SK0114H	SM/ADAPT PANEL 4 BOBBIN C	-10	+200	IN	0-35	CPS
SR5001P	HELIUM PRESS TANK A	+0	+5000	PSIA	10	S/S
SR5002P	HELIUM PRESS TANK B	+0	+5000	PSIA	10	S/S
SR5003P	HELIUM PRESS TANK C	+0	+5000	PSIA	10	S/S
SR5004P	HELIUM PRESS TANK D	+0	+5000	PSIA	10	S/S
SR5065T	TEMP ENGINE PACKAGE A	+0	+100	DEG C	1.25	S/S
SR5066T	TEMP ENGINE PACKAGE B	+C	+100	DEG C	1.25	S/S
SR5067T	TEMP ENGINE PACKAGE C	+0	+100	DEG C	1.25	S/S

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MARCH 5, 1963

APOLLO VEHICLE LIST		BOILERPLATE 18			
MEAS	MEASUREMENT AC DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
SR5068T	TEMP ENGINE PACKAGE D	+0	+100 DEG C	1.25	S/S
SR5075P	HE REGULATOR OUT PRESS A	+0	+300 PSIA	10	S/S
SR5076P	HE REGULATOR OUT PRESS B	+0	+300 PSIA	10	S/S
SR5077P	HE REGULATOR OUT PRESS C	+0	+300 PSIA	10	S/S
SR5078P	HE REGULATOR OUT PRESS D	+0	+300 PSIA	10	S/S
SR5620T	TEMP SM RCS NOZZLE	+0	+600 DEG C	1.25	S/S
SR5621T	TEMP SM RCS NOZZLE	+0	+600 DEG C	1.25	S/S
SR5622T	TEMP SM RCS NOZZLE	+0	+600 DEG C	1.25	S/S
SR5623T	TEMP SM RCS NOZZLE	+0	+600 DEG C	1.25	S/S
SR5624T	TEMP SM RCS NOZZLE	+0	+600 DEG C	1.25	S/S
SR5747P	B CHAMBER PRESS ENGINE -Y	+0	+150 PSIA	10	S/S
SR5760P	D CHAMBER PRESS ENGINE +Y	+0	+150 PSIA	10	S/S
SR5794P	A CHAMBER PRESS ENGINE -P	+0	+150 PSIA	10	S/S
SR5865P	C CHAMBER PRESS ENGINE +P	+0	+150 PSIA	10	S/S
CT0002V	TRANSPONDER A TRIGGER	+0	+5 VDC	10	S/S
CT0003V	TRANSPONDER B TRIGGER	+0	+5 VDC	10	S/S
CT0201T	TM RF XMTR A TEMP	+0	+150 DEG C	1.25	S/S
CT0202T	TM RF AMP A TEMP	+0	+150 DEG C	1.25	S/S
CT0203T	TM RF XMTR B TEMP	+0	+150 DEG C	1.25	S/S

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MARCH 5, 1963

BOILERPLATE 18

MEAS NG	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE		RESPONSE RATE	UNIT	
			LOW	HIGH			
CT0204T	TM RF AMP B TEMP		+0	+150	DEG C	1.25	S/S
CT0205T	TM RF XMTR C TEMP		+0	+150	DEG C	1.25	S/S
CTC207T	TM RF AMP C TEMP		+0	+150	DEG C	1.25	S/S

APOLLO VEHICLE LIST

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VI. BOILERPLATE 22

MISSION

The mission of boilerplate 22 is to demonstrate high altitude abort.

MEASUREMENT REQUIREMENTS

The following boilerplate 22 measurement list reflects the proposed measurement parameters, as of 1 April 1963, necessary to satisfy mission and system requirements.

These measurements are being coordinated with NASA.

Leo Wolff
Leo Wolff
Project Engineer
Boilerplate 22

Responsible Engineers:

W. Barmore
W. Barmore 695-451
Engineer
Instrumentation

E. F. Kraly
E. F. Kraly 695-312
Engineer
Measurement Requirements Group

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APOLLO VEHICLE LIST

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
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CA0001A	X AXIS SPACECRAFT ACCEL HIGH	-10	+20 G	0-30 CPS	
CA0002A	X AXIS SPACECRAFT ACCEL LOW	-2	+2 G	0-30 CPS	
CA0005A	Y AXIS SPACECRAFT ACCEL	-10	+10 G	0-20 CPS	
CA0007A	Z AXIS SPACECRAFT ACCEL	-10	+10 G	0-20 CPS	
LA0011A	Y AXIS TOWER ACCEL	-10	+10 G	0-30 CPS	
LA0012A	Z AXIS TOWER ACCEL	-10	+10 G	0-30 CPS	
CA0028P	CONICAL SURFACE PRESSURE 1	+0	+15 PSIA	10 S/S	
CA0029P	CONICAL SURFACE PRESSURE 2	+0	+15 PSIA	10 S/S	
CA0030P	CONICAL SURFACE PRESSURE 3	+0	+15 PSIA	10 S/S	
CA0031P	CONICAL SURFACE PRESSURE 4	+0	+15 PSIA	10 S/S	
CA0032P	CONICAL SURFACE PRESSURE 5	+0	+15 PSIA	10 S/S	
CA0033P	CONICAL SURFACE PRESSURE 6	+0	+15 PSIA	10 S/S	
CA0034P	CONICAL SURFACE PRESSURE 7	+0	+15 PSIA	10 S/S	
CA0035P	CONICAL SURFACE PRESSURE 8	+0	+15 PSIA	10 S/S	
CA0036P	CONICAL SURFACE PRESSURE 9	+0	+15 PSIA	10 S/S	
CA0037P	CONICAL SURFACE PRESSURE 10	+0	+15 PSIA	10 S/S	
CA0038P	CONICAL SURFACE PRESSURE 11	+0	+15 PSIA	10 S/S	
CA0039P	CONICAL SURFACE PRESSURE 12	+0	+15 PSIA	10 S/S	
CA0040P	CONICAL SURFACE PRESSURE 13	+0	+15 PSIA	10 S/S	

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MARCH 15, 1963

APOLLO VEHICLE LIST

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	BOILERPLATE 22		RESPONSE RATE UNIT
			DATA RANGE LOW	HIGH	
CA0041P	CONICAL SURFACE PRESSURE 14	+0	+15	PSIA	10 S/S
CA0042P	CONICAL SURFACE PRESSURE 15	+0	+15	PSIA	10 S/S
CA0043P	CONICAL SURFACE PRESSURE 16	+0	+15	PSIA	10 S/S
CA0044P	CONICAL SURFACE PRESSURE 17	+0	+15	PSIA	10 S/S
CA0045P	CONICAL SURFACE PRESSURE 18	+0	+15	PSIA	10 S/S
CA0046P	CONICAL SURFACE PRESSURE 19	+0	+15	PSIA	10 S/S
CA0047P	CONICAL SURFACE PRESSURE 20	+0	+15	PSIA	10 S/S
CA0048P	CONICAL SURFACE PRESSURE 21	+0	+15	PSIA	10 S/S
CA0049P	CONICAL SURFACE PRESSURE 22	+0	+15	PSIA	10 S/S
CA0050P	CONICAL SURFACE PRESSURE 23	+0	+15	PSIA	10 S/S
CA0051P	CONICAL SURFACE PRESSURE 24	+0	+15	PSIA	10 S/S
CA0052P	CONICAL SURFACE PRESSURE 25	+0	+15	PSIA	10 S/S
CA0053P	CONICAL SURFACE PRESSURE 26	+0	+15	PSIA	10 S/S
CA0054P	CONICAL SURFACE PRESSURE 27	+0	+15	PSIA	10 S/S
CA0055P	CONICAL SURFACE PRESSURE 28	+0	+15	PSIA	10 S/S
CA0056P	CONICAL SURFACE PRESSURE 29	+0	+15	PSIA	10 S/S
CA0057P	CONICAL SURFACE PRESSURE 30	+0	+15	PSIA	10 S/S
CA0058P	CONICAL SURFACE PRESSURE 31	+0	+15	PSIA	10 S/S
CA0059P	CONICAL SURFACE PRESSURE 32	+0	+15	PSIA	10 S/S

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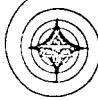
APOLLO VEHICLE LIST

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	BOILERPLATE 22		RESPONSE RATE	UNIT
			LOW	HIGH		
CA0060P	CONICAL SURFACE PRESSURE 33	+	0	+15 PSIA	10	S/S
CA0061P	CONICAL SURFACE PRESSURE 34	+	0	+15 PSIA	10	S/S
CA0062P	CONICAL SURFACE PRESSURE 35	+	0	+15 PSIA	10	S/S
CA0063P	CONICAL SURFACE PRESSURE 36	+	0	+15 PSIA	10	S/S
CA0100P	BASE PRESSURE 1	+	0	+2 PSIA	10	S/S
CA0101P	BASE PRESSURE 2	+	0	+2 PSIA	10	S/S
CA0102P	BASE PRESSURE 3	+	0	+2 PSIA	10	S/S
CA0103P	BASE PRESSURE 4	+	0	+2 PSIA	10	S/S
LA0199S	STRAIN 1 TOWER DIAGONAL	-5000	+5000	UIN/I	0-10	CPS
LA0200S	STRAIN 1 TOWER LEG	-5000	+5000	UIN/I	0-10	CPS
LA0201S	STRAIN 2 TOWER DIAGONAL	-5000	+5000	UIN/I	0-10	CPS
LA0202S	STRAIN 2 TOWER LEG	-5000	+5000	UIN/I	0-10	CPS
LA0203S	STRAIN 3 TOWER DIAGONAL	-5000	+5000	UIN/I	0-10	CPS
LA0204S	STRAIN 3 TOWER LEG	-5000	+5000	UIN/I	0-10	CPS
LA0205S	STRAIN 4 TOWER DIAGONAL	-5000	+5000	UIN/I	0-10	CPS
LA0206S	STRAIN 4 TOWER LEG	-5000	+5000	UIN/I	0-10	CPS
CA0610T	CM INTERIOR TEMP	+	0	+150 DEG C	1.25	S/S
CA0611P	CM INTERIOR PRESS	+	0	+15 PSIA	10	S/S
CA2430R	HEAT FLUX (CALORIMETER) 1	+	0	+100 B/F/S	1.25	S/S

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BOILERPLATE 22

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CA2431R	HEAT FLUX (CALORIMETER) 2	+0	+100 B/F/S	1.25	S/S
CA2432R	HEAT FLUX (CALORIMETER) 3	+0	+100 B/F/S	1.25	S/S
CA2433R	HEAT FLUX (CALORIMETER) 4	+0	+100 B/F/S	1.25	S/S
CA2434R	HEAT FLUX (CALORIMETER) 5	+0	+100 B/F/S	1.25	S/S
CA2435R	HEAT FLUX (CALORIMETER) 6	+0	+100 B/F/S	1.25	S/S
CA2436R	HEAT FLUX (CALORIMETER) 7	+0	+100 B/F/S	1.25	S/S
CA2437R	HEAT FLUX (CALORIMETER) 8	+0	+100 B/F/S	1.25	S/S
CA2438R	HEAT FLUX (CALORIMETER) 9	+0	+100 B/F/S	1.25	S/S
CA2439R	HEAT FLUX (CALORIMETER) 10	+0	+100 B/F/S	1.25	S/S
CA2440R	HEAT FLUX (CALORIMETER) 11	+0	+100 B/F/S	1.25	S/S
CA2441R	HEAT FLUX (CALORIMETER) 12	+0	+100 B/F/S	1.25	S/S
CA2442R	HEAT FLUX (CALORIMETER) 13	+0	+100 B/F/S	1.25	S/S
CA2443R	HEAT FLUX (CALORIMETER) 14	+0	+100 B/F/S	1.25	S/S
LA2450R	TWR HEAT FLUX (CALORIMETER) 1	+0	+100 B/F/S	1.25	S/S
LA2451R	TWR HEAT FLUX (CALORIMETER) 2	+0	+100 B/F/S	1.25	S/S
LA2452R	TWR HEAT FLUX (CALORIMETER) 3	+0	+100 B/F/S	1.25	S/S
CA2470P	CM PLUME LES IMPG PRESS 1	+0	+20 PSIA	10	S/S
CA2471P	CM PLUME LES IMPG PRESS 2	+0	+20 PSIA	10	S/S
CA2490R	STRAKE HEAT FLUX (CALORIMETER) 1	+0	+100 B/F/S	1.25	S/S

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APOLLO VEHICLE LIST

MARCH 15, 1963

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE	RESPONSE RATE	UNIT
			LOW	HIGH	
CA2491R	STRAKE HEAT FLUX (CALORIMETER) 2	+0	+100	B/F/S	1.25 S/S
CA2492R	STRAKE HEAT FLUX (CALORIMETER) 3	+0	+100	B/F/S	1.25 S/S
LA2500P	LES ENG BASE PRESS 1	+0	+10	PSIA	10 S/S
LA2501P	LES ENG BASE PRESS 2	+0	+10	PSIA	10 S/S
LA2510T	SEPARATION TEMP MOTOR BASE	+0	+1400	DEG F	1.25 S/S
CA2511T	SEPARATION TEMP APEX	+0	+1400	DEG F	1.25 S/S
CA2520D	CM VIBRATION 1	-50	+50	G	5-1K CPS
CA2521D	CM VIBRATION 2	-50	+50	G	5-1K CPS
CA2522D	CM VIBRATION 3	-50	+50	G	5-1K CPS
CA2523D	CM VIBRATION 4	-50	+50	G	5-1K CPS
CC0001V	DC VOLTAGE MAIN BUS A	+22	+32	VDC	10 S/S
CC0002V	DC VOLTAGE MAIN BUS B	+22	+32	VDC	10 S/S
CC0003V	DC VOLTAGE PYRO BUS A	+0	+32	VDC	10 S/S
CC0004V	DC VOLTAGE PYRO BUS B	+0	+32	VDC	10 S/S
CC0005C	TOTAL DC CURRENT	+0	+35	AMPS	10 S/S
BU0001X	LIFT OFF SIGNAL A	+0	+32	VDC	10 S/S
BD0002X	LIFT OFF SIGNAL B	+0	+32	VDC	10 S/S
LD0012P	PITCH CONTROL MTR CHAMBER PRESS	+0	+2500	PSID	10 S/S
LC0013P	ESCAPE MOTOR CHAMBER PRESSURE	+0	+2500	PSID	10 S/S

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MARCH 15, 1963

BOILERPLATE 22

APOLLO VEHICLE LIST

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CD0021X	ABORT INITIATE RELAY CLOSE A	STEP	10	S/S	
CD0022X	ABORT INITIATE RELAY CLOSE B	STEP	10	S/S	
CD0023X	CM-SM SEP SQUIB RLY CLOSE A	STEP	10	S/S	
CD0024X	CM-SM SEP SQUIB RLY CLOSE B	STEP	10	S/S	
CD0033X	TWR JETT AND SEP RELAY CLOSE A	STEP	10	S/S	
CD0034X	TWR JETT AND SEP RELAY CLOSE B	STEP	10	S/S	
CD0037X	ELS SEQ START RELAY CLOSE A	STEP	10	S/S	
CD0038X	ELS SEQ START RELAY CLOSE B	STEP	10	S/S	
CE0001X	DROGUE DEPLOY RELAY CLOSE A	STEP	10	S/S	
CE0002X	DROGUE DEPLOY RELAY CLOSE B	STEP	10	S/S	
CE0003X	MAIN CHUTE DEPL-DRG REL RELAY A	STEP	10	S/S	
CE0004X	MAIN CHUTE DEPL-DRG REL RELAY B	STEP	10	S/S	
CE0005X	MN CHUTE RELEASE RELAY CLOSE A	STEP	10	S/S	
CE0006X	MN CHUTE RELEASE RELAY CLOSE B	STEP	10	S/S	
CE0007X	FWD HIT SHLD SQUIB FIRE RLY A	STEP	10	S/S	
CF0008X	FWD HIT SHLD SQUIB FIRE RLY B	STEP	10	S/S	
CE0018P	CM PRESS FWD COMPARTMENT	+0	+15 PSIA	10	S/S
CE0020X	BARG SW 3 15000 F/F A	+0	+32 VDC	10	S/S
CE0021X	BARG SW 3 15000 F/F B	+0	+32 VDC	10	S/S

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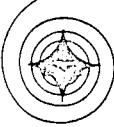
APOLLO VEHICLE LIST

MARCH 15, 1963

BOILERPLATE 22

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CE0022X	BARG SW 1 25000 FT A	+0	+32 VDC	10	S/S
CE0023X	BARG SW 1 25000 FT B	+0	+32 VDC	10	S/S
CE0026X	BARG SW 4 15000 FT A	+0	+32 VDC	10	S/S
CE0027X	BARG SW 4 15000 FT B	+0	+32 VDC	10	S/S
CE0028X	BARG SW 2 25000 FT A	+0	+32 VDC	10	S/S
CE0029X	BARG SW 2 25000 FT B	+0	+32 VDC	10	S/S
CE0035P	BAROMETRIC PRESS STATIC REF	+0	+15 PSIA	10	S/S
CH0046V	PITCH RATE GYRO DEMOD OUT	+0	+5 VCC	0-10	CPS
CH0087C	+ PITCH/+X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH0088C	- PITCH/+X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH0089C	+ PITCH/-X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH0090C	- PITCH/-X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH0092C	ROLL/+Y SOLENOID DRIVER OUT	EVENT	10	S/S	
CH1046V	YAW RATE GYRO DEMOD OUT	+0	+5 VDC	0-10	CPS
CH1080C	- YAW/-X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH1087C	+ YAW/+X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH1088C	- YAW/+X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH1089C	+ YAW/-X SOLENOID DRIVER OUT	EVENT	10	S/S	
CH2046V	ROLL RATE GYRO DEMOD OUT	+0	+5 VDC	0-10	CPS

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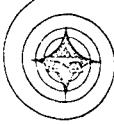
APOLLO VEHICLE LIST

MARCH 15, 1963

BOILERPLATE 22

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CH2089C	+ ROLL/-Z SOLENOID DRIVER OUT			EVENT	10 S/S
CH2090C	- ROLL/-Z SOLENOID DRIVER OUT			EVENT	10 S/S
CH2093C	+ ROLL/-Y SOLENOID DRIVER OUT			EVENT	10 S/S
CK0001R	PITCH RATE GYRO OUTPUT		-100 +100	DEG/S	0-10 CPS
CK0002R	YAW RATE GYRO OUTPUT		-100 +100	DEG/S	0-10 CPS
CK0003R	ROLL RATE GYRO OUTPUT		-100 +100	DEG/S	0-10 CPS
CK0016H	PITCH ATTITUDE GYRO OUTPUT		-180 +180	DEG	10 S/S
CK0017H	ROLL ATTITUDE GYRO OUTPUT		-180 +180	DEG	10 S/S
CK0018H	YAW ATTITUDE GYRO OUTPUT		-180 +180	DEG	10 S/S
LK0023H	ANGLE OF ATTACK		-40 +40	DEG	10 S/S
LK0024H	ANGLE OF SIDESLIP		-40 +40	DEG	10 S/S
LK0025P	DYNAMIC PRESSURE		+0 +1250	PSF	10 S/S
CRO001P	HE PRESS TANK A		+0 +5000	PSIA	10 S/S
CRO002P	HE PRESS TANK B		+0 +5000	PSIA	10 S/S
CRO003T	HE TEMP TANK A		-100 +200	DEG F	1.25 S/S
CRO004T	HE TEMP TANK B		-100 +200	DEG F	1.25 S/S
CRO005P	INLET HE PRESS FUEL LINE TANK A		+0 +400	PSIA	10 S/S
CRO006P	INLET HE PRESS FUEL LINE TANK B		+0 +400	PSIA	10 S/S
CRO009T	TEMP FUEL TANK A		+0 +300	DEG F	1.25 S/S

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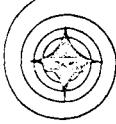
APOLLO VEHICLE LIST

BOILERPLATE 22

MARCH 15, 1963

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CR0010T	TEMP FUEL TANK B	+0	+300 DEG F	1.25	S/S
CR0011P	INLET HE PRESS OXIDIZER LINE TANK A	+0	+400 PSIA	10	S/S
CR0012P	INLET HE PRESS OXIDIZER LINE TANK B	+0	+400 PSIA	10	S/S
CR0015T	TEMP OXIDIZER TANK A	+0	+300 DEG F	1.25	S/S
CR0016T	TEMP OXIDIZER TANK B	+0	+300 DEG F	1.25	S/S
CR0040T	TEMP PROP ENG VLV BODY +P SYS A	+0	+300 DEG F	1.25	S/S
CR0041T	TEMP PROP ENG VLV BODY -P SYS A	+0	+300 DEG F	1.25	S/S
CR0042T	TEMP PROP ENG VLV BODY +Y SYS A	+0	+300 DEG F	1.25	S/S
CR0043T	TEMP PROP ENG VLV BODY -Y SYS A	+0	+300 DEG F	1.25	S/S
CR0044T	TEMP PROP ENG VLV BODY +R SYS A	+0	+300 DEG F	1.25	S/S
CR0045T	TEMP PROP ENG VLV BODY -R SYS A	+0	+300 DEG F	1.25	S/S
CR0050T	TEMP PROP ENG VLV BODY +P SYS B	+0	+300 DEG F	1.25	S/S
CR0051T	TEMP PROP ENG VLV BODY -P SYS B	+0	+300 DEG F	1.25	S/S
CR0052T	TEMP PROP ENG VLV BODY +Y SYS B	+0	+300 DEG F	1.25	S/S
CR0054T	TEMP PROP ENG VLV BODY +R SYS B	+0	+300 DEG F	1.25	S/S
CR0055T	TEMP PROP ENG VLV BODY -R SYS B	+0	+300 DEG F	1.25	S/S
CR0053P	TEMP PROP ENG VLV BODY -Y SYS B	+0	+300 DEG F	1.25	S/S
CR0052P	HE REGS OUT PRESS TANK A	+0	+400 PSIA	1.25	S/S
CR0053P	HE REGS OUT PRESS TANK B	+0	+400 PSIA	1.25	S/S

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APOLLO VEHICLE LIST

MARCH 15, 1963

MEAS NG NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE		RESPONSE RATE	UNIT
			LOW	HIGH		
CRO514T	CCW ROLL ENG CHAMBER PRESS SYS A	+0	+200	PSIA	10	S/S
CRO515P	CW ROLL ENG CHAMBER PRESS SYS A	+0	+200	PSIA	10	S/S
CRO516P	-PITCH ENG CHAMBER PRESS SYS A	+0	+200	PSIA	10	S/S
CRO517P	+PITCH ENG CHAMBER PRESS SYS A	+0	+200	PSIA	10	S/S
CRO518P	-YAW ENG CHAMBER PRESS SYS A	+0	+200	PSIA	10	S/S
CRO519P	+YAW ENG CHAMBER PRESS SYS A	+0	+200	PSIA	10	S/S
CRO520P	CCW ROLL ENG CHAMBER PRESS SYS B	+0	+200	PSIA	10	S/S
CRO521P	CW ROLL ENG CHAMBER PRESS SYS B	+0	+200	PSIA	10	S/S
CRO522P	-PITCH ENG CHAMBER PRESS SYS B	+0	+200	PSIA	10	S/S
CRO523P	+PITCH ENG CHAMBER PRESS SYS B	+0	+200	PSIA	10	S/S
CRO524P	-YAW ENG CHAMBER PRESS SYS B	+0	+200	PSIA	10	S/S
CRO525P	+YAW ENG CHAMBER PRESS SYS B	+0	+200	PSIA	10	S/S
CROSSOTCCW	ROLL ENG OUTER WALL TEMP SYS A	+0	+700	DEG F	1.25	S/S
CROSSOTCWW	ROLL ENG OUTER WALL TEMP SYS A	+0	+700	DEG F	1.25	S/S
CROSS521	CW ROLL ENG OUTER WALL TEMP SYS A	+0	+700	DEG F	1.25	S/S
CROSS521	-PITCH ENG OUTER WALL TEMP SYS A	+0	+700	DEG F	1.25	S/S
CROSS544	+PITCH ENG OUTER WALL TEMP SYS A	+0	+700	DEG F	1.25	S/S
CROSS581	CCW ROLL FUEL LINE TEMP A	+0	+300	DEG F	1.25	S/S
CROSS601	-PITCH ENG FUEL LINE TEMP A	+0	+300	DEG F	1.25	S/S
CROSS621	+YAW ENG FUEL LINE TEMP A	+0	+300	DEG F	1.25	S/S

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APOLLO VEHICLE LIST

MARCH 15, 1963

MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CRO565T C W ROLL ENG FUEL LINE TEMP B		+0	+300 DEG F	1.25	S/S
CRO567T + PITCH ENG FUEL LINE TEMP B		+0	+300 DEG F	1.25	S/S
CRO569T + YAW ENG FUEL LINE TEMP B		+0	+300 DEG F	1.25	S/S
CRO570T CCW ROLL ENG GX LINE TEMP A		+0	+300 DEG F	1.25	S/S
CRO571T -PITCH ENG GX LINE TEMP A		+0	+300 DEG F	1.25	S/S
CRO573T + PITCH ENG GX LINE TEMP B		+0	+300 DEG F	1.25	S/S
CRO574T -YAW ENG GX LINE TEMP A		+0	+300 DEG F	1.25	S/S
CRO576T C W ROLL ENG GX LINE TEMP B		+0	+300 DEG F	1.25	S/S
CRO581T + YAW ENG GX LINE TEMP B		+0	+300 DEG F	1.25	S/S
CRO584P CCW ROLL ENG FUEL LINE PRESS A		+0	+1000 PSIA	10	S/S
CRO586P - PITCH ENG FUEL LINE PRESS A		+0	+1000 PSIA	10	S/S
CRO590P C W ROLL ENG GX LINE PRESS A		+0	+1000 PSIA	10	S/S
CRO592P - PITCH ENG GX LINE PRESS A		+0	+1000 PSIA	10	S/S
CRO623P FUEL LINE PRESS SYS A		+0	+1000 PSIA	10	S/S
CRO624P FUEL LINE PRESS SYS B		+0	+1000 PSIA	10	S/S
CRO625P OXIDIZER LINE PRESS SYS A		+0	+1000 PSIA	10	S/S
CRO626P OXIDIZER LINE PRESS SYS B		+0	+1000 PSIA	10	S/S
CRO631P C W ROLL ENG FUEL LINE PRESS B		+0	+1000 PSIA	10	S/S
CRO633P + PITCH ENG FUEL LINE PRESS B		+0	+1000 PSIA	10	S/S

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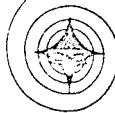
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APOLLO VEHICLE LIST		BOILERPLATE 22		MARCH 15, 1963	
MEAS NO	MEASUREMENT DESCRIPTION	CHANNEL	DATA RANGE LOW HIGH	RESPONSE RATE	UNIT
CRO634P	- YAW ENG FUEL LINE PRESS A	+0	+1000 PSIA	10	S/S
CRO635P	+ YAW ENG FUEL LINE PRESS B	+0	+1000 PSIA	10	S/S
CRO637P	CH ROLL ENG GX LINE PRESS B	+0	+1000 PSIA	10	S/S
CRO639P	+ PITCH ENG GX LINE PRESS B	+0	+1000 PSIA	10	S/S
CRO640P	- YAW ENG GX LINE PRESS A	+0	+1000 PSIA	10	S/S
CRO641P	+ YAW ENG GX LINE PRESS B	+0	+1000 PSIA	10	S/S
CRO650T	- YAW ENG CUTER WALL TEMP SYS A	+0	+700 DEG F	1.25	S/S
CRO654T	+ YAW ENG CUTER WALL TEMP SYS A	+0	+700 DEG F	1.25	S/S
CRO658T	CCW ROLL ENG OUTER WALL TEMP SYS B	+0	+700 DEG F	1.25	S/S
CRO666T	- PITCH ENG CUTER WALL TEMP SYS B	+0	+700 DEG F	1.25	S/S
CRO670T	+ PITCH ENG OUTER WALL TEMP SYS B	+0	+700 DEG F	1.25	S/S
CRO674T	- YAW ENG CUTER WALL TEMP SYS B	+0	+700 DEG F	1.25	S/S
CRO678T	+ YAW ENG CUTER WALL TEMP SYS B	+0	+700 DEG F	1.25	S/S
CRO662T	CH ROLL ENG OUTER WALL TEMP SYS B	+0	+700 DEG F	1.25	S/S
CT0001W	ON-BOARD TIMER		0-35 CPS		
CT0002V	TRANSPONDER A TRIGGER	+0	+5 VCC	10	S/S
CT0003V	TRANSPONDER B TRIGGER	+0	+5 VCC	10	S/S
CT0007X	R AND Z CALIBRATION MONITOR	STEP	10	S/S	
CT0201T	TM RF XMTR A TEMP	+0	+150 DEG C	1.25	S/S

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MARCH 15, 1963

BOILERPLATE 22

MEAS NO	DESCRIPTION	CHANNEL	DATA RANGE		RESPONSE RATE	UNIT
			LOW	HIGH		
CT02021	TM RF AMP A TEMP		+0	+150	DEG C	1.25 S/S
CT0203T	TM RF XMTR B TEMP		+0	+150	DEG C	1.25 S/S
CT0204T	TM RF AMP B TEMP		+0	+150	DEG C	1.25 S/S

APOLLO VEHICLE LIST

CT02021	TM RF AMP A TEMP
CT0203T	TM RF XMTR B TEMP
CT0204T	TM RF AMP B TEMP